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LECTURE II.

Cholelithiasis and Cholecystitis.

That there is an intimate association between gall-stones and carcinoma of the biliary passages, especially the gall-bladder, has long been recognised, but much difference of opinion still exists as to the exact relation of cause and effect.

In a series of 43 cases of carcinoma of the gall-bladder seen in the post-mortem room at Leeds, there were 30 with gall-stones, 69·8 per cent., as compared with 16·4 per cent. in the control series (1031 gall-stone cases in 6284 autopsies †). The difference (53·4 ± 7·0 per cent.) is highly significant. Various authors record similar and even higher rates (69 to 100 per cent., Rolleston and McNee, 1929). In the Leeds series there were also 20 cases of carcinoma of the larger (extra-hepatic) bile-ducts, including 11 with cholelithiasis, 55 per cent. The difference between this figure and the control (38·6 ± 11·1 per cent.) is less striking, but still significant. In the statistics of other authors gall-stones have usually been present in about one-third of the cases (Rolleston and McNee).

The closeness of association of the two diseases is equally well brought out when the problem is approached from the opposite standpoint. In the Leeds series the incidence of carcinoma of the biliary tract in cases of cholelithiasis was 3·8 per cent. as compared with 0·4 per cent. in the controls, a difference (3·4 ± 0·59 per cent.) which is highly significant. Other authors give even higher figures for the malignant cases (4 to 14 per cent.).

Of the principal varieties of biliary calculi, multiple facetted, solitary cholesterol, mulberry and pigment stones, it is apparently the first which is most frequently encountered in association with local cancer. Unfortunately it has been found possible to classify with exactness barely one half our total cases of cholelithiasis (Table IX.).

Table IX.—*Relative Frequency of Multiple Facetted and Solitary Cholesterol Gall-stones in Cancer of the Biliary Tract.*

Types of stones.	6284 control cases (over 40).	63 cases of cancer of biliary tract.	Percentage difference.	Standard error of difference.	Statistical significance.
	With gall-stones.				
Multiple facetted .	202(3·2%)	15(23·8%)	20·6	5·37	+
Solitary cholesterol	176(2·8%)	3 (4·8%)	2·0	2·10	—

This shows clearly that the association is with multiple facetted calculi. Solitary cholesterol stones do not occur with significantly greater frequency in cases of biliary tract cancer than in the controls. Now, it is well known that it is the multiple facetted and pigment calculi which are chiefly encountered in cases of cholecystitis, and there are good grounds for the belief that the inflammatory lesion antedates, and is causally related to, the other. The solitary cholesterol and mulberry stones are of metabolic origin, and, as Gross (1929) has clearly shown, are unassociated with definite inflammatory lesions of the gall-bladder. The most probable sequence of events would therefore appear to be cholecystitis, cholelithiasis, carcinoma. The gall-stones may well act in a dual capacity, on the one hand maintaining and increasing the inflammatory reaction, on the other exerting a directly carcinogenic effect, mechanical or chemical, on the surviving epithelium.

Experimental evidence that gall-stones are capable of inducing carcinoma of the gall-bladder has been provided by Leitch (1924), who inserted into the gall-bladder of a series of guinea-pigs human gall-stones, pebbles, and pilules of pitch and lanoline. In eight (five with gall-stones, two with pebbles, and one with pitch) an apparent adenocarcinoma developed after 5½ to 12 months. The tumours had not undergone metastasis, and were not flagrantly malignant of aspect, but they were definitely infiltrative, and had invaded the liver, diaphragm, and abdominal muscles. Leitch himself was satisfied as to their carcinomatous nature. In two of the positive animals sterile pebbles had been used, and Leitch was of opinion that the causative factor was physical trauma rather than chemical irritation.

Gastric Ulcer.

This continues to be a topic of perennial interest to physician and surgeon, pathologist and radiologist alike, and it cannot be said that we have yet got to the root of the problem. What are the chances of a chronic gastric ulcer becoming malignant? How may this transformation be detected at the earliest possible moment? How may a surgeon at the time of operation know whether a cratered lesion of the stomach is simple or malignant? By what histological criteria may the pathologist distinguish between a simple ulcer, an ulcerative cancer, and a *carcinoma ex ulcere*? These are some of the practical issues on which further illumination is required.

INDEPENDENT COEXISTENCE OF ULCER AND CANCER.

It is a rare event for a simple chronic ulcer and a carcinoma to occur independently in the same stomach. In a series of 366 operation specimens examined between Jan. 1st, 1921, and June 1st, 1931, there were but three instances, and in a still larger series from the post-mortem room the incidence was even less. In only one case, seen at autopsy, were the two lesions situated side by side. Their independence of each other was manifest, since they had obviously come together in consequence of the centrifugal spread of the carcinoma. The ulcer, a typical chronic lesion, was situated almost exactly on the middle of the lesser curvature, and had given rise to a moderate grade of organic hour-glass contraction. The new growth, an equally typical ulcerated carcinoma, was situated saddle-wise across the lesser curvature, and extended from the upper margin of the ulcer to the cardia. In the other instances the cancer occupied its more usual position at or near the pylorus, the ulcer being situated one or two inches higher up.

MORBID ANATOMY AND HISTOLOGY.

There are certain points in the structure and evolution of a chronic ulcer and of a primary carcinoma

* The Croonian Lectures delivered before the Royal College of Physicians of London on June 4th, 9th, and 11th, 1931. Lecture I. appeared last week.

† Only cases 40 years of age and over are included.

of the stomach which must be kept clearly in mind when considering the question of ulcer-cancer.

(1) The great majority of chronic ulcers which have existed for any length of time (months or years) have completely breached the muscular coat over an area at least as large as the widest part of the crater itself. This gap is occupied, though at a lower level, by a typical mass of dense sclerotic tissue, covered on its interior aspect by a narrow zone of fibrinoid necrosis and a quantity of purulent exudate and necrotic debris. The muscular coat either terminates abruptly in the lateral walls of the crater, or turns upwards into the floor when contraction is taking place therein. In healing ulcers, or at any point in the margin where partial healing has occurred, the muscular coat and the muscularis mucosæ tend to blend with one another in a very characteristic fashion.

(2) When a chronic ulcer has healed, there is usually remarkably good regeneration of the mucous coat, together with some slight regeneration of the muscularis mucosæ. The most notable permanent changes are in the muscular coat, which is not regenerated. There is complete and permanent replacement of a considerable area of muscularis, the extent of which depends on the size and chronicity of the original ulcer, by dense collagenous scar tissue. At first the scarred area is broad and cellular, but with the passage of months and years it becomes excessively sclerotic, almost acellular, and comes to contain masses of elastic tissue which cause it to be yellow instead of white. In many scars a certain amount of epithelial displacement, so-called deep regenerative heteroptopia, is encountered, by which simple, newly formed glands grow downwards into the surface layers of scar tissue and into or even through the muscularis mucosæ at the margins. It is a benign, self-limiting process, and there is no evidence that it is a precursor of malignant disease.

(3) When a carcinoma arises in a chronic ulcer it does so in the margin, probably at one point only. As the tumour increases in size it tends to encircle the ulcer rather than to penetrate the sclerotic floor, while also growing outwards from it. Ultimately the crater becomes completely surrounded by growth, while the floor itself may be partially invaded.

Much of the difficulty in the pathological diagnosis of ulcer-cancer arises in cases of this kind. Where there is only a small focus of malignancy on one side of a chronic ulcer there can be no doubt as to the sequence of events. When a cratered lesion shows a typical central ulcer floor devoid of cancer cells, with a complete ring of carcinomatous tissue encircling it, the question is, can such a lesion be brought about by secondary peptic ulceration of a primary carcinoma? If the whole floor of the crater is covered by growth, it is necessary to know whether such an appearance can result from the cancerisation of an ulcer.

(4) Primary carcinoma, even when it has infiltrated the whole thickness of the stomach wall, tends to conservation of the muscular coat, in many cases of the muscularis mucosæ as well (Dible, 1924–25; Stewart, 1926, 1928, 1929). These structures are, in fact, often much hypertrophied, standing out prominently on section, and even in that very fibrous lesion, the leather-bottle stomach, bundles of unstriped muscle persist in the midst of the fibro-neoplastic tissue. When secondary peptic ulceration is superimposed, however, neoplastic and non-neoplastic tissue alike gives way before it, and a more or less deeply cratered lesion results. If in the floor of such an ulcer persisting bundles of unstriped muscle, however scanty, can be detected amongst the tumour tissue assuredly the lesion is primarily carcinomatous. If a continuous zone of carcinomatous tissue across the floor of the ulcer is supported by dense scar tissue devoid of muscle-fibres, it is practically impossible on anatomical grounds to come to a definite decision.

Other facts in the case must be taken into account, the exact site of the lesion, the results of previous gastric analysis, and, in particular, the clinical history. Just as difficult are the cases in which scattered carcinomatous foci are present throughout an otherwise typically ulcerous floor, or when only a small area of cancer-cell-free sclerosis is present in the midst of the carcinomatous tissue. Unless there is definite clinical support for a diagnosis of ulcer-cancer it is my practice not to include such cases in this group. I certainly think it is possible for carcinomatous tissue to grow inwards over the floor of a simple ulcer, replacing the inner more cellular layer of granulation tissue. It is much more difficult for the neoplasm to replace or even to permeate the densely sclerotic deeper layers. I have recently encountered a case in which a carcinoma of the greater curvature had extended round the walls of the stomach until its margins met on the lesser curvature just below the site of a previously existing scar, and it was interesting to notice how considerable a barrier this had interposed to the further upward extension of the growth at this point. Only a few islets of epithelial tissue, though these of some size, had succeeded in penetrating the sclerotic mass. No conclusive evidence is available, on the other hand, that peptic ulceration of a primary carcinoma is capable of producing a zone of cancer-cell-free fibrosis in the floor. Assuredly this process may lead to an extensive breach of the muscularis, and, as Newcomb (1930) has pointed out, the same is true, *mutatis mutandis*, for some ulcerated carcinomas of the large intestine. In 100 intestinal cancers examined by him, six showed absence of muscle in the base of the lesion, and four of these exhibited marked fibrosis as well. Dr. Newcomb has been good enough to show me some of these sections, and in none of them is there an area of *cancer-cell-free* fibrosis such as one finds in ulcer-cancer of the stomach. This is the salient point of my criteria, and I do not think that Newcomb's analogy in any way detracts from its value. There can be no doubt of the great importance of Turnbull and Newcomb's (1925) criterion of fusion of muscularis mucosæ and muscularis as evidence of pre-existing ulcer. My contention, however, is that if this sign is always insisted on a number of real ulcer-cancers will be wrongly classified as ulcerated carcinomas. Fusion of these layers is evidence of healing, and carcinoma can undoubtedly arise in ulcers where no indication of healing exists.

One other possibility must be mentioned, that peptic ulceration commencing in a carcinoma may spread thence to the adjacent healthy wall. In my series there are four such cases, but in none had the ulcerative process involved the muscular coat to any serious extent. Clinically, such cases would resemble primary carcinoma rather than ulcer-cancer.

TABLE X.—*Position of Chronic Ulcer, Ulcer-cancer, and Primary Cancer in a Series of 358 Operation Specimens.*

Site of lesion.	Chronic ulcer.	Ulcer-cancer.	Primary cancer.
Pyloric canal ..	15 (5·7%)	5 (29%)	71 (84·5%)
Lesser curvature region	248 (94·3%)	12 (71%)	9 (10·7%)
Rest of stomach ..	—	—	4 (4·8%)
Total *lesions*, 364*	263	17†	84

* In three cases two chronic ulcers coexisted, and in three others there were independent ulcers and cancers.
† Four of these cases in which death followed partial gastrectomy are also included in Table XI.

SITE OF THE LESION.

The vast majority of chronic gastric ulcers, fully 80 per cent., are situated in the lesser curvature region, most of the remainder being at or near the pylorus. Carcinoma, on the other hand, commences in the pyloric region in about two-thirds of the cases. The site of ulcer-cancer, as one would expect, approximates to that of simple ulcer (Table X.).

It may be objected that this gives only a partial and inaccurate view of the position, since it omits all

inoperable cases. This objection applies with any force only to cases of carcinoma, and much less forcibly to ulcer-cancer. Table XI. has therefore been compiled from autopsy material to give a truer picture.

TABLE XI.—*Position of Primary Carcinoma and of Ulcer-cancer of the Stomach in a Series of 279 Post-mortem Specimens.*

—	Primary carcinoma.	Ulcer-cancer.
Pyloric canal	145 (64·1%)*	10 (31%)
Lesser curvature region	18 (8·0%)	22 (69%)
Cardiac region	37 (16·4%)	—
Rest of organ	26 (11·5%)	—
Totals	226	32†
Whole organ (more or less) ..	21	—
	247	—

* Twenty-one cases in which the whole or almost the whole organ was involved are not included in estimating the percentage incidence.
† Four of these cases in which death resulted from partial gastrectomy are also included in the list of 17 ulcer-cancers shown in Table X.

The topographical distribution of ulcer-cancer here shown, approximating as it does much more closely to that of ulcer than to that of cancer, would seem to indicate that the criteria used in the diagnosis of ulcer-cancer are reasonably near the truth. Tables XII. and XIII. focus attention on the comparative frequency with which carcinoma arises in pre-existing ulcer in the two main sites.

TABLE XII.—*Position of Chronic Gastric Ulcer in Relation to the Subsequent Development of Ulcer-cancer. (277* Clinical Specimens.)*

—	Ulcers.	With cancer arising in them.	Incidence of cancer.
Pyloric canal	20	5	25·0%
Lesser curvature ..	260	12	4·6%
Total	280*	17	—

* In three cases two chronic ulcers coexisted.

TABLE XIII.—*Position of Gastric Carcinoma in Relation to Pre-existing Simple Ulcer. (101 Clinical Specimens.)*

—	Carcinomas.	Arising in ulcer.	Incidence.
Pyloric canal	76	5	6·6%
Lesser curvature region	21	12	57·1%
Rest of stomach ..	4	0	—

Orator (1925), whose figure for the incidence of cancer in ulcer is very similar to my own (5·1 per cent., as compared with 6·1 per cent.), gets fairly comparable figures to those shown in Table XII. (11 cases of cancer arising in 34 ulcers of the pyloric canal—33·2 per cent.; 6 cases in 300 lesser curve ulcers—2·0 per cent.).

The conclusions to be drawn from these figures—i.e., for partial gastrectomy material only—are (1) that out of every three carcinomas arising in the lesser curvature region one inch or more from the pylorus approximately two have had their origin in a pre-existing simple ulcer, and (2) that whereas only one lesser curve ulcer in 20 shows evidence of malignant transformation, one in every four of those situated in the pyloric canal shows this change. What is the explanation of this difference? Hurst (1929*a*) suggests with much cogency that the additional factor is friction. He points out that neither the fundus of the stomach (where cancer is extremely rare) nor the duodenal bulb (where it is unknown) is ever subjected to friction. It is only in the pyloric vestibule that definite churning movements occur. Friction, minimal in the body of the stomach, steadily increases in intensity as the pylorus is approached, owing to the increasing depth of the peristaltic waves. It is probably for this reason that primary ulcer in the pyloric canal, though of comparatively infrequent occurrence, is particularly liable to malignant transformation.

PERFORATION.

In primary carcinoma of the stomach, perforation, whether acute or subacute, is a comparatively rare event. It had occurred in 15 of 276 cases in my autopsy series (5·4 per cent.). Simple chronic ulcer, on the other hand, shows a high perforation rate, 85 out of 242 cases (35 per cent.). The figures for ulcer-cancer approximate closely to those of simple ulcer, 9 out of 28 cases (32 per cent.). Those who refuse to accept these as genuine examples of *carcinoma ex ulcere* may reasonably claim that they represent merely a special group of primary cancers in which secondary peptic ulceration is unusually far advanced. I prefer to regard these figures as further confirmation of the truth of my ulcer-cancer criteria.

GASTRIC ANALYSIS.

The typical case of primary carcinoma with a short history shows either achlorhydria or hypochlorhydria when investigated by the fractional test-meal method. Complete achlorhydria was present in 65 per cent. of 74 cases investigated by Hurst (1929*a*), and other authors give comparable figures. There is naturally much less available evidence in connexion with ulcer-cancer. In my series fractional test-meals had been carried out in only nine cases, but the results are striking. No fewer than six had a high normal or hyperchlorhydric curve. In Table XIV. the results are compared with those obtained in 54 cases of simple ulcer and 30 cases of primary carcinoma. In each a partial gastrectomy had been performed and the specimen submitted to careful microscopic examination.

TABLE XIV.—*Fractional Test-meal Results in a Series of Pathologically Verified Cases of Ulcer, Ulcer-cancer, and Cancer of the Stomach.*

—	Simple chronic ulcer (54 cases).	Ulcer-cancer (9 cases).	Primary cancer (30 cases).
Achlorhydria ..	20% { 3 (6%)	13% { 0	80% { 22 (73%)
Hypochlorhydria	7 }	1 }	2 }
Normal	35 } 94%	5 } 100%	6 } 27%
Hyperchlorhydria	9 }	3 }	0 }

These figures are few, but they suggest that in contradistinction to primary carcinoma a normal or hyperchlorhydric curve is the rule in ulcer-cancer as in ulcer. They may reasonably be regarded as affording further confirmation of the criteria of ulcer-cancer set forth above. There is, of course, an alternative hypothesis—that a certain small proportion of primary carcinomas arise in stomachs which still possess a normal or hypernormal secretion of free hydrochloric acid. Such carcinomas would be more likely than those associated with achlorhydria to undergo secondary peptic ulceration, with on the one hand an increased tendency to perforation, and on

the other a liability to assume in time the characters here regarded as typical of ulcer-cancer.

CLINICAL HISTORY.

Most writers on this subject have emphasised the importance of the clinical history in confirming or otherwise the conclusions arrived at on anatomical grounds (Dible 1924–25). The discovery that a lesion, regarded on pathological ground as ulcer-cancer, has given rise to symptoms for a few months only, is liable to shake one's faith in the reliability of one's histological criteria. In my series only one such case occurs, and it must be remembered that chronic ulcers do occasionally form and persist with little or no clinical evidence of their presence. Table XV. presents an analysis of my clinical material to date.

TABLE XV.—*Duration of Symptoms at the Time of Operation in* (A) *Simple Chronic Ulcer,* (B) *Primary Carcinoma, and* (C) *Ulcer-cancer of the Stomach.*

Duration of symptoms.	Simple ulcer (218 cases).	Primary cancer (69 cases).	Ulcer-cancer (17 cases).
0–6 months	9 } 10 %	31 } 73 %	1 } 6 %
6 months–1 year ..	14 }	19 }	0 }
1–2 years	17	7	1
Over 2 years	178 (82 %)	12 (17 %)	15 (88 %)
„ 5 „	136 (62 %)	0	11 (65 %)
Average duration of symptoms	8 years	11 months	5¼ years

These figures I submit are strong evidence in support of the accuracy of one's anatomical criteria.

Hurst (1929*b*) and others have emphasised the fact that when a simple ulcer undergoes malignant degeneration there is not infrequently a definite change in the symptomatology. The pain becomes more severe and more persistent, it ceases to observe its former time-relation to the taking of food, coming on, as a rule, immediately after meals instead of after a constant interval, and remissions either do not occur or are much less complete than before. Hurst also stresses the importance of the persistence of occult blood in the stools in spite of the most rigid dietetic and medicinal treatment, and the fact that radiologically the ulcer-crater, while it may get smaller, never completely disappears, as it does in most cases of chronic ulcer when properly treated. I would add a further point. The presence of altered blood in all or most of the fractions of the Rehfuss test-meal is strongly suggestive of malignancy, and if encountered in a case with a long ulcer-history the possibility of malignant degeneration must at once be raised. In the nine ulcer-cancer cases in my series in which a fractional test-meal was done, blood was present in seven. This contrasts with the findings in simple chronic ulcer, where altered blood is rarely encountered in routine test-meal examinations.

FREQUENCY OF ULCER-CANCER.

It is impossible to say with any degree of certainty what proportion of chronic ulcers become malignant, but the number is probably small. Most chronic ulcers will heal if given a chance, and with the restoration of continuity of the stomach wall the chances of malignant metamorphosis become greatly reduced. The incidence of carcinoma in ulcers which have been removed surgically is not inconsiderable, in my series 17 in 277, or 6·1 per cent. It is clear from the frequency with which well-healed scars are encountered in the stomach that the actual proportion of chronic ulcers which become malignant must be much less than this. The importance of chronic ulcer as a precancerous condition is, however, more strikingly brought out by regarding the problem from the cancer point of view. Of 109 operation specimens of carcinoma of the stomach in my series 17, or 15·6 per cent., showed evidence of having originated in a pre-existing simple ulcer.

DIAGNOSIS OF ULCER-CANCER AT OPERATION.

This is likely to be excessively difficult. A pre-operative diagnosis should be aimed at. It may be impossible to decide from inspection of the stomach in situ whether the lesion is a perfectly simple chronic ulcer or one in which malignant proliferation has commenced. The physician, or possibly the physician and surgeon in concert, should decide on clinical grounds what operative treatment if any is desirable, and this decision should only be modified by very definite contra-indications presenting themselves at operation. It is equally difficult, in cases of obvious malignancy, to determine at operation whether or not this has originated in simple ulcer, but here the matter has become of academic interest only. In ulcer specimens which have been removed surgically and in which the interior can be closely inspected it is often possible to form an opinion naked eye as to whether cancer is present or no. Early carcinoma betrays itself by irregularity and nodulation of the margin. At the best such an opinion must be provisional and subject to revision on histological examination. I must confess to having wrongly suspected the presence of cancer naked-eye more often than I have failed to detect its presence.

Chronic Gastritis.

In the matter of chronic gastritis and cancer I must reserve judgment. Unfortunately most of my material was taken without having this question in view, and while it is possible to say that both in ulcer and in cancer well-marked chronic gastritic changes are common in the lesser curvature region—"pylorus gastritis" of Faber (1927)—I have found little evidence of a generalised gastritis of the cul-de-sac or greater curvature in either of these diseases. Hurst (1929*a*) has shown that the achlorhydria which exists in from 50 to 75 per cent. of cases of carcinoma of the stomach is almost certainly an antecedent condition and not the result of the malignant disease. He has never seen a case in which free hydrochloric acid was present at an early stage and disappeared as the disease advanced, but he has seen three in which a test-meal was given both before and after the onset of malignant degeneration of ulcer. Hyperchlorhydria was present in two and a normal acid curve in the third. In each the degree of acidity was undiminished when the carcinoma had developed. He quotes two other cases in which achlorhydria existed at least three years before the discovery of inoperable carcinoma. On the other hand, I have seen a case in which there was hyperchlorhydria two years and six months before an exploratory laparotomy for ulcer-cancer, by which time there was achlorhydria except for 20° of free HCl in the half-hour fraction. The patient came to post-mortem a day or two later, having died from perforation of an ulcer-cancer of the upper part of the lesser curvature. There had been a history very suggestive of gastric ulcer extending over nearly 20 years.

Hurst is of opinion that the achlorhydria which ordinarily precedes and accompanies primary carcinoma is the result of long-standing chronic gastritis. Two things have to be taken into account: (1) a chronic gastritis of the pyloric and lesser curvature regions as an actual precancerous lesion, and (2) a pan-gastritis as the cause of the achlorhydria. In my experience a chronic gastritis of the lesser curvature and pyloric regions is very common in cases of gastric ulcer, less common in cases of carcinoma. The lesion varies greatly in severity, and passes through hypertrophic and atrophic stages. At first the stroma is merely overrun by inflammatory cells, lymphocytes and plasma cells particularly, especially in its superficial zone. Later this extends to the deeper parts of the mucosa and there is a notable increase in the amount of lymphoid tissue, both superficial and deep

to the muscularis mucosæ. Still later there is atrophy of the secretory glands, which may go on to complete destruction, the mucosa then consisting merely of inflammatory stroma and lymphoid tissue with a covering of simple cubical or columnar epithelium. In a very few cases of this kind I have seen carcinoma arising, apparently as a widespread superficial change. A type of vegetative epithelium is sometimes seen in these cases which might well be regarded as precancerous. The cells and their nuclei are well-stained and the normal content of mucin, in small droplets, is partially or completely lacking. The contrast between this epithelium, which is usually though not invariably limited to the surface zones, and the rest of the epithelium is remarkable, and a point of particular interest is that these hyperplastic cells obviously resist post mortem peptic digestion much more strongly than the others. I believe this to be a real precancerous condition, but am unable to say how often it progresses to malignancy.

Pangastritis of any severity is, in my limited experience, uncommon in both ulcer and cancer. Even in cancer cases with achlorhydria very little change may be present in the mucosa of the greater curvature, the oxyntic cells being apparently well preserved.

Duodenal Ulcer.

Those who argue against a close association between gastric ulcer and cancer usually refer to the remarkable fact that whereas chronic duodenal ulcer is definitely more common than gastric, carcinoma arising within the duodenal bulb is almost unknown. On the other hand, since carcinoma of the stomach is itself a common disease and primary duodenal cancer extremely rare (Table XVI.), this can hardly be regarded as a valid argument.

TABLE XVI.—*Incidence of Primary Carcinoma of the Gastro-intestinal Tract in a Series of 12,800 Autopsies at all Ages (Leeds 1910–31).*

—	Cases.	Percentage incidence.
Stomach	322	2·5
Small intestine	12	0·094
Duodenum .. .. .. (Supra-ampullary portion, 1; ampullary portion, 3)	4	0·031
Jejunum	5	0·063
Ileum	3	
Ampulla of Vater	4	0·031
Large intestine	473	3·7

The incidence of primary carcinoma of the duodenum in this series, 0·031 per cent., may be compared with the figure obtained by Jefferson (1916–17) from a large series of collected data, 43 cases in 109,201 autopsies (0·04 per cent.).

A more important point is the anatomical distribution of duodenal cancer itself. For this purpose it is usual to recognise three divisions of the duodenum, supra-ampullary, peri-ampullary and infra-ampullary (Fenwick, 1901). In most cases the tumour arises in the peri-ampullary zone, but it is then not always possible to determine whether it has had its origin in the duodenal mucosa or in the ampulla of Vater.

In the Leeds series (Table XVI.) there were four certainly arising in the ampulla, while of four apparently primary duodenal cancers three were peri-ampullary and one only supra-ampullary. The latter was situated 4 cm. from the pylorus—i.e., beyond the usual ulcer-bearing area. Fenwick (1901), in 51 cases of duodenal cancer, found 11 (21·5 per cent.) supra-ampullary, 29 (57 per cent.) peri-ampullary, and 7 (13·5 per cent.) infra-ampullary.‡ In Geiser's series of 71 cases the distribution was 11 (15·5 per cent.), 51 (71·8 per cent.), and 9 (12·7 per cent.). Probably the rarest site of all is the duodenal bulb, the position in which chronic ulcers or their scars are most frequently encountered.

‡ In the remaining 8 per cent. the disease involved the whole or greater part of the duodenum.

Jefferson (1916–17) has collected 31 cases of carcinoma regarded as arising in pre-existing duodenal ulcers or scars. They form a thoroughly unconvincing series, though it is just possible that a few of them may be authentic. In Jefferson's own case the tumour was 2·5 cm. from the sphincter pylori, and there was no sign of ulcer at autopsy. However, a gastro-jejunostomy had been performed some three years or so before, when it was stated that a duodenal ulcer had been found.

Kettle (1930) has reported one of the most convincing examples of ulcer-cancer of the duodenum, yet even in it there are elements of doubt. The histological criteria seem to be beyond cavil. The floor of the lesion was composed of dense sclerotic tissue indistinguishable from that ordinarily seen in chronic duodenal ulcers, there was a wide breach in the muscular coat, occupied by the fibrous tissue above-mentioned, and some of the smaller arteries showed well-developed endarteritis. Carcinomatous tissue was present all round the margin and had slightly invaded the sclerotic floor. There was also some clinical evidence, though not conclusive, of long-standing ulceration. Against ulcer-cancer was the position of the lesion at the junction of the first and second portions of the duodenum 4·5 cm. from the pylorus. Cases of chronic ulcer have certainly been reported in this situation, but they must be extremely rare. In my post-mortem series of 475 chronic lesions of the duodenum, ulcers and scars, all were within the duodenal bulb and not more than 2·5 cm. from the pylorus.

In 15 cases of duodenal carcinoma reported from the Mayo Clinic by Eusterman, Berkman, and Swan (1925), six were supra-ampullary, and in one the tumour was related to the scar of a healed duodenal ulcer.

Bearing in mind the great frequency of chronic ulceration and scarring in this situation it is a justifiable conclusion from a review of the literature that chronic duodenal ulcer is not a precancerous condition.

Diverticulitis.

The frequency and clinical importance of diverticulosis and diverticulitis of the large intestine have only been established in recent years. A very complete and detailed study of the clinical and pathological aspects of the condition was published by Telling and Gruner in 1917 and much admirable work has since been done on the radiological aspect by Spriggs and Marxer (1925) and many others. The condition of multiple diverticula or diverticulosis is a common one. It occurred in 158 of 1901 consecutive patients examined radiologically by Spriggs (1927)—8·3 per cent. Diverticulitis was present in only 17 of these—12 per cent. In 160 cases of diverticulosis examined in the post-mortem room at Leeds 23 (14 per cent.) had diverticulitis.

The occurrence of carcinoma in association with diverticula or diverticulitis was first reported by Hochenegg (1902), and since then scattered case-reports have made their appearance in the literature. Wilson (1911) reported four instances in 15 cases of diverticulosis operated on at the Mayo Clinic, and concluded that this was a definitely precancerous condition. He believed that the malignant changes arose in islets of epithelium segregated by the diverticular and peridiverticular inflammation. Telling and Gruner, who found 11 instances of carcinoma in a collected series of 324 cases of diverticulosis, took a similar view. The Mayo Clinic material has recently been reviewed by Rankin and Brown (1930), who found diverticulosis in 5 per cent. of all persons with large bowel symptoms and estimate the probable frequency in all persons at 1 per cent. Diverticulitis probably existed in 17 per cent. of the cases with diverticulosis. In 227 cases of *diverticulitis* requiring surgical treatment, cancer coexisted in four. In another series of 679 cases operated on for carcinoma of the bowel there were four with *diverticulosis*. They conclude that the relationship is incidental rather than significant.

My own more limited experience supports Rankin and Brown's view. In 160 cases of diverticulosis of the large intestine there were six with carcinoma coli, but of these only three were situated in the diverticula-bearing region. Twenty-three of the 160 cases were the seat of inflammatory changes, but only one of the six cases of malignant disease occurred in this group and there was nothing to suggest that it was of diverticular origin. In a discussion following a

paper on diverticulitis and cancer by D. F. Jones (1930) Fallon mentioned that in a review of the Mayo Clinic records, including 1800 cases of diverticulosis, of which 625 showed diverticulitis and 19 carcinoma, and 1600 cases of carcinoma coli, of which 19 showed evidence of previous diverticulitis, he found only one case in which there was reasonable evidence that the carcinoma had arisen in a diverticulum. It may be concluded that diverticulitis is of no practical importance as a precancerous condition.

CARCINOID TUMOUR OF THE APPENDIX AND SMALL INTESTINE.

The appendix shares with the small intestine a remarkable immunity from the ordinary varieties of epithelial cancer, contrasting in this respect with the stomach and large intestine. In the appendix the neoplasm most frequently encountered, though even this is rare, is the well-known carcinoid tumour (Oberndorfer, 1907), now recognised (Gosset and Masson 1914, Masson 1924, 1928) to be a derivative of the neurogenous Kultschitzky cells which line the bottom of the crypts of Lieberkühn. These cells, of endodermal origin, bud outwards and invade the periglandular and subglandular nerve plexuses of the mucosa stimulating them to neuromatous overgrowth, a process most likely to happen in organs already the seat of an old obliterative inflammatory lesion.

Carcinoid tumours arise by neoplastic proliferation of these invading "neurocrine" cells, which, at first confined within the nerve sheaths, presently burst out into the connective tissue of the submucosa and invade the muscular coats. It is a slowly growing tumour of epithelial type, resembling in many respects the basal-cell carcinoma of the skin. It rarely disseminates to the regional lymph glands, and still more rarely to the liver or other organs (Stewart and Taylor, 1926). Its most frequent site is at the tip of the appendix. In the small intestine, where it occurs but rarely, it is usually multiple.

The association with old inflammatory disease of the appendix is well established (Kennedy 1909, 1910; Oberndorfer 1928), the tumour apparently arising in segregated portions of the mucous membrane which have had their continuity with the rest of the lumen and with the intestine interrupted by obliterative fibrosis.

So far as the small intestine is concerned no antecedent inflammatory lesion has been described. Those interested may be referred to the comprehensive studies of Masson (1924, 1928) and Forbus (1925).

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(*Continued at foot of next column.*)

AN OUTBREAK OF RABIES IN TRINIDAD

WITHOUT HISTORY OF BITES, AND WITH THE SYMPTOMS OF ACUTE ASCENDING MYELITIS.

BY E. WESTON HURST, B.SC., M.D. BIRM.,
PATHOLOGIST TO THE MILBANK RESEARCH FUND, LISTER INSTITUTE, LONDON;
AND
J. L. PAWAN, M.B. EDIN., D.P.H.,
GOVERNMENT BACTERIOLOGIST, TRINIDAD.

RECORDS of rabies are of the greatest antiquity, dating back to the fifth century B.C. Though until comparatively recently it was believed that in the dog and wolf the contagium arose de novo, from the time of Aristotle onwards the human disease has always been associated with the bite of a rabid animal. While, for various reasons, in isolated cases no history of trauma may be available, an outbreak such as the present, in which no history of bites can be elicited, has never been described, and no other mode of transmission is recognised. Again, while paralytic rabies is not uncommon, an epidemic consisting solely of cases of the paralytic type is unprecedented. The facts we are about to record will, therefore, prove of interest alike to the neurologist, the epidemiologist, and the student of filterable viruses.

Description of the Epidemic.

EPIDEMIOLOGY.

History.—In July, 1929, there occurred in the village of Siparia in south-western Trinidad a case of acute ascending myelitis; this was followed within three months—i.e., during the rainy season—by 12 others. In the opinion of the local medical practitioners the cases constituted a distinctly unusual clinical entity. During the period July–August, 1930, three further cases were observed, and one early in 1931, when Sir Wilfred Beveridge visited the island on behalf of the Colonial Office. All 17 cases terminated fatally. At first localised to Siparia and its neighbourhood, the disease later spread further north towards the oilfield area.

Race.—The disease was confined to natives of the labouring class, who walk with bare feet. Well-to-do natives and Europeans have so far been unaffected. Of the 17 cases, three were members of the East Indian race, the others Negroes or descendants of Negroes.

Age and sex.—The age-incidence is interesting and is shown below:—

1929.		1930–31.	
0–5 years	1		
6–10 ,,	4	6–10 years	1
11–15 ,,	3	11–15 ,,	1
16–20 ,,	2	30–35 ,,	1
26–30 ,,	3	36–40 ,,	1

It is to be noted that in the 1929 cases a large proportion were in children of school age (the first two

(*Continued from previous column.*)

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cases occurred in the same school), and that the disease was not uniformly spread over the various age periods. Eleven males were affected and six females. In two instances more than one case occurred in a single household; in one the illness of a lad of 15 (still attending school on account of backwardness) was followed by that of his father, and the eighth case was a sister of the first.

Animal morbidity.—During the period covered by the present epidemic, the only disease prevalent among animals was one diagnosed as botulism in cattle, horses, donkeys, and mules; this will be dealt with later. With this exception, no undue prevalence of disease in wild or domestic animals has been noted during the last six years, though the inquiry respecting animal morbidity extended even to the mongoose and vampire bat. No case of rabies has been recognised since 1914. Quarantine laws are of the strictest and, except for animals coming from the United Kingdom, no dog can enter the island without a quarantine of at least six months and inspection and certification by the Government veterinary surgeon. In no instance was there history of a bite, nor on admission to hospital was there any evidence of injury.

The possibility of transmission by biting flies and insects was also considered, but with similar negative results. The mosquito and stomoxys fly are not more prevalent in the district affected than in other parts of the island.

Every case on notification was immediately removed to hospital and isolated. The premises were disinfected and the schools closed.

CLINICAL FEATURES.

From a clinical standpoint the cases formed a fairly homogeneous group with the characteristic and definite symptomatology of an ascending myelitis. Until experimental investigations were made, the outbreak was considered by some practitioners as probably one of acute poliomyelitis; this was rendered more likely by the fact that in the earlier cases no sensory changes were detected.

The onset was usually acute with fever and often headache. In many cases symptoms began with a sensation of burning and tingling, usually in the foot or leg, but sometimes in the back, and curiously enough nearly always on the left side; in some, retention of urine or paresis of the legs was the first sign. After one to four days, weakness of the leg became apparent, and developed more or less rapidly into complete paralysis, with loss of the tendon and plantar reflexes. The other limb and the trunk muscles were soon affected. Retention or incontinence of urine and constipation were present in every case. One to several days later, extension of the paralysis to the muscles of deglutition and respiration led to increasing difficulty in swallowing, dyspnœa, extreme restlessness, and invariable death. In some cases paralysis of the arms preceded the fatal termination, but in others considerable power still remained at the time of failure of respiration. Sensory changes appear to have been of variable occurrence; in only some of the patients was a loss of sensation to touch, pinprick, and heat and cold reported to extend upwards to the level of the pelvis, umbilicus, or lower ribs. Except for periods of delirium, the sufferers usually retained consciousness, and could answer questions intelligently until the end; in a few cases, however, drowsiness marked the middle stages of the illness, and at the close the patient was unconscious.

A swinging temperature varying from normal to 103° F. or higher was accompanied by profuse sweating, which was a very marked feature in nearly every case; as a terminal event the temperature sometimes rose to 104° F. or higher. As a rule the pulse and respiration increased in rate progressively as the state of the patient worsened. There was no nausea, vomiting, or cutaneous eruption.

It must be emphasised that difficulty in swallowing, associated in some cases with dribbling of saliva, occurred only in the terminal stages when paralysis of the bulbar muscles was obvious; hydrophobic symptoms were never present in the early stages. In Case 2 alone (see below) did spasmodic difficulty in swallowing during the later stages suggest to the doctor in attendance that the case "looked like one of hydrophobia." General muscular spasm was absent during the whole course of the illness; in several cases, however, stiffness of the neck was observed. Nervous symptoms were never preceded by a stage of excitement. At the height of the disease the cases had the anxious facies seen before the crisis in pneumonia, but clinically and post mortem the lungs were normal. Death was due primarily to respiratory failure and not to syncope.

With the exception of ptosis in one case, ocular paralyses were absent, as was optic neuritis in the patients examined from this point of view.

Examination of the blood and urine was always negative; no malarial parasite was found. Lumbar puncture was performed in five cases. The cerebro-spinal fluid was perfectly clear and not under pressure; examination showed increase of globulin and contaminating organisms, but no cells. Circumstances, however, did not permit examination until about 12 or 16 hours after removal. Bacteriological investigation of throat and nasal swabs threw no light on the causation of the malady.

In 13 cases the duration of the illness was from four to eight days. One case died on the 3rd, one on the 10th, one on the 21st, and one on the 30th day.

The histories of the cases on which experimental work was carried out are set forth below.

CASE 1.—Female Negro labourer, aged 28, well-nourished and well-developed. Admitted August 20th, 1930, with a four days' history of pain and burning in the left foot.—August 21st. Numbness of left leg with absent knee-jerks and some loss of sensation in the foot.—August 22nd. Both legs weak, but patient still able to extend and flex at the knees and hips. Loss of sensation of left foot as far as ankle. Profuse sweating. Lumbar puncture yielded a slightly turbid fluid under moderate pressure, and showing, 12 hours later, some increase of globulin but no cells.—August 23rd. Weakness more marked and sensation lost in both legs as far upwards as the middle of the calves. 9 P.M. Complete paralysis of both legs with loss of sensation to the hips. Patient restless and sweating profusely. Periods of delirium, but questions answered rationally. Catheterisation necessary.—August 24th. Bladder and abdomen distended. Paresis of arms now apparent. Difficulty in swallowing. Dyspnœa. Loss of sensation to umbilicus. Death at 7 P.M.

CASE 2.—Female Negro schoolgirl, aged 10. Admitted to hospital Jan. 24th, 1931, with two days' history of fever, pains in the right lower limb, and difficulty in micturition. On admission she complained of pain in the right lumbar region radiating to the thigh and iliac fossa. Temperature, 99.8° F; pulse-rate, 112; respiration, 24. No weakness of limbs and no sensory loss. No retention of urine. Condition remained unchanged during next day.—Jan. 26th. Rapidly developed flaccid paralysis of lower limbs, with loss of sensation and incontinence of urine. Tendon reflexes abolished.—Jan. 27th. Temperature, 100° F.; pulse-rate, 136; respiration, 24. Profuse sweating. Weakness of arms with marked dyspnœa and difficulty in swallowing; the medical attendant thought that patient looked like a case of hydrophobia. Complete paralysis with loss of sensation in legs. Incontinence of urine. At 4 P.M. dyspnœa became worse, and inability to swallow was absolute. Profuse sweating continued. Lumbar puncture yielded a clear fluid under moderate pressure; 16 hours later no cells were seen. Death at 7 P.M.

POST-MORTEM FINDINGS.

The meninges over the brain and cord were congested, but no purulent exudate was present. In cases dying after three or four days the cord was of normal consistency, but the cross-section showed congestion and loss of demarcation between the grey and the white matter. In those succumbing after seven or more days the cord was much softer than normal, and in the lumbar region was often almost diffluent; these observations were made within a few hours of death, and were, in consequence, not attributable to post-mortem degeneration.

Except for congestion the other organs showed little departure from normal; in the heart, however, petechial hæmorrhages occurred with some frequency, especially along the line of junction between auricles and ventricles.

Material sent from Trinidad for histological study unfortunately miscarried, and at the time of writing only a single section from Case 1 and a piece of cord from Case 2, preserved in glycerin and fixed later in formol-saline, are available for section.

The section from Case 1 shows in both grey and white matter marked perivascular infiltration with large and small lymphocytes, a few large mononuclears and occasional polymorphs. There is diffuse infiltration of the grey matter with proliferated microglial cells and a few lymphocytes and polymorphs. Many of the anterior horn cells are well preserved, but some show complete chromatolysis, and others marked degenerative changes accompanied by neuronophagia. From this single section it is impossible to draw definite conclusions, as the appearances are compatible with a diagnosis either of poliomyelitis or of rabies.

In the second case the dorsal cord shows only occasional slight cuffing of the vessels, and most of the nerve-cells are normal. A few Babes nodules are present. No Negri bodies are to be seen. The appearances here are in keeping with a diagnosis of rabies.

Experimental Investigation.

Pieces of spinal cord from Case 1 and of a number of regions of the central nervous system from Case 2 were placed in sterile glycerin and forwarded to the Lister Institute.

Since, from the data available at the time, it was considered likely that the disease was poliomyelitis, the spinal cord of the first case was inoculated in doses of 1 or 2 c.cm. of a 10 per cent. emulsion in sterile saline into the left parieto-occipital lobe of each of four monkeys (*Macacus rhesus*). After incubation periods of 15, 17, 17, and 42 days respectively, the animals developed rather curious symptoms less characteristic of rabies than those observed later in passage animals. The following protocol is typical of three of the cases.

M.420. Received Nov. 25th, 1930, 2 c.cm. of a 10 per cent. spinal cord emulsion in the left parieto-occipital lobe.—Dec. 10th. Found clinging to the bars of its cage uttering repeated and peculiarly piercing shrieks quite unlike the normal cry of the monkey. These cries were emitted only during observation, and on withdrawal of the observer they ceased; the animal appeared to be in a state of extreme terror. It showed a disinclination to move, but when pushed off the bars of its cage its movements were quite active.—Dec. 13th. The animal now squealed continually, whether observed or not. It appeared to be generally weak, but no definite localised paresis could be detected. No muscular spasms were observed. The previous day's food had been left untouched.—Dec. 15th. The monkey had a staring gaze, and seemed unaware of the presence of food, of its cage-mate, or of the observer. It squealed continually, and the cries were much weaker than before. On interference it did not attempt to bite. The chin was abraded from constant picking with the fingers. Muscular spasms did not occur and no definite paralysis or rigidity was present. The animal was very emaciated, with a subnormal temperature, and as it seemed unlikely to survive until next day it was etherised.

The fourth animal behaved otherwise.

M.444. Received Nov. 25th, 1930, 2 c.cm. of a 10 per cent. emulsion in the left parieto-occipital lobe and 3 c.cm. intramuscularly.—Dec. 12th. The animal showed some tendency to squeal like the others, but, from the first, localised weakness was apparent in the legs. During the next few days it gradually became more sleepy.—Dec. 16th. Paresis of the legs was now marked. The monkey lay apparently asleep on the floor of its cage, and though it could be momentarily roused it immediately lapsed into somnolence.—Dec. 17th. The animal was very sleepy, and completely apathetic, even to painful stimuli. Flaccid paralysis was present in the legs. In the arms, which fell limply to the side when released, considerable power still persisted, so that the apparent weakness seemed due to the animal's mental condition. Thus after repeated stimulation it could be induced to grasp the observer's finger; when suspended in the air the animal once more lapsed into somnolence, its grip gradually relaxed, and eventually it fell to the ground. No muscular spasms occurred. Later in the day the temperature was subnormal, and the animal was etherised.

At *autopsy*, definite macroscopic changes were noted only in M.444, which showed several hæmorrhagic areas in the lungs and intestines. Cultures, aerobic and anaerobic, from the brains of all four animals remained sterile for ten days.

In animals inoculated from the above, the symptoms were typical of rabies, and very similar to those in a monkey infected with the *virus fixe*. After a short period, in which the animal was actively aggressive, and in one case killed its cage-mate, violent muscular spasms, occasionally sufficient to throw the animal bodily across the cage, occurred and gradually passed into a stage of general weakness ending in death. In different cases one or other of these manifestations predominated; convulsions might persist almost to the end or, from a very early stage, great general weakness, associated once with definite paralysis of the legs, might be the most conspicuous feature. In some cases nystagmoid movements of the eyes were observed, and the animal nearly always wore a dazed expression. Three animals bit themselves severely, two chewing off the end of a finger, and one the whole skin of the forearm, exposing the muscles from the elbow to the wrist. The onset of symptoms was sometimes heralded on the preceding day by a rise of temperature, but more often no temperature disturbance was noted. The incubation period varied between 6 and 11 days, and was commonly 7 to 9 days; death frequently occurred within 12 hours, and always within 48 hours of the first symptom. The disease has now been transmitted to five generations of monkeys by intracerebral or intraneural inoculation; unfiltered emulsions and Chamberland LI *bis* filtrates have alike been effective.

Some difficulty was experienced in establishing the original monkey virus in rabbits, and at first it could not be taken past the first or second passage, but ultimately by choice of suitable animals the seventh generation was reached. The symptoms were typical of paralytic rabies, and indistinguishable from those due to the *virus fixe*.

Material from the second human case was inoculated intracerebrally into a monkey and several rabbits. The rabbits all died from sepsis due to contaminating organisms in the inoculum, and further rabbits injected subcutaneously with brain emulsion or intracerebrally with a Berkefeld N filtrate remained well over a period of three months. The monkey survived with a localised cerebral abscess, and on the thirty-eighth day developed typical rabies; from its brain the disease was transmitted without difficulty to four generations of rabbits.

In all the experimental animals lesions characteristic of rabies existed in the central nervous system. Only some of the rabbits showed well-developed Negri bodies; in the monkeys, without exception, typical Negri bodies with "innerkörperchen" were present in the cornu ammonis, and often in other parts of the brain and cord.*

Cross-immunity tests between the Trinidad virus and the *virus fixe* (Paris strain) are not yet completed. As far as they go they reveal a partial cross-immunity between the two viruses, inasmuch as immunisation with the *virus fixe* protects against the intracerebral inoculation of Trinidad virus while the reverse does not obtain. The sera of animals immunised with *virus fixe* neutralises to an equal degree the two viruses. The final results of these tests will be published later; at the moment there seems no reason to doubt the close relationship of the two viruses, though the Trinidad virus appears to be poor antigenically and unable to protect against the highly virulent *virus fixe*.

The Disease of Cattle.

Since July, 1925, a disease diagnosed as botulism has occurred in cattle and the equidæ. In that year among various herds, totalling approximately 450 head, in and around the Queen's Park, Savannah (Port of Spain), there were 46 deaths. Outbreaks of the disease have since appeared throughout the island; cases have been less numerous around Siparia than in districts free from the human malady. Local veterinary surgeons, most of whom were thoroughly acquainted with the condition as seen in the United States and Canada, agreed that the disease was botulism, as did Dr. Robert Graham, of Urbana, Illinois, and Dr. G. E. Jacobi, of Minneapolis. Further, in two instances, one of us (J. L. P.) isolated the *Bacillus botulinus* from the liver and spleen by means of Bengston's cooked meat medium (1924), and Dubovsky and Meyer's medium (1922); the organism was also found in samples of soil and water from "infected" pastures. There seemed, therefore, no reason to doubt the diagnosis made.

The main symptoms consisted in constipation, grinding of the teeth, salivation, tremor and involuntary movements, muscular incoördination, and finally prostration, respiratory failure, and death; the disease evolved in the absence of any rise of temperature.

The owners of cattle among the labouring classes are mostly East Indians, who tend their animals with the same affectionate care as their compatriots in India, and are thus brought into close contact with them. Despite this fact only three of the 17 cases of the human disease occurred in East Indians, and in no single instance has even a remote connexion been established between a human case and infected cattle or their secretions. Epidemiologically, therefore, there seemed to be no connexion between the human and the bovine disease.

Nevertheless, from the brain of a cow suffering from so-called botulism we have obtained a virus similar to that from the human cases, while in the cornu ammonis of a second cow typical Negri bodies were detected. It appears, consequently, either that botulism and rabies exist side by side and are clinically indistinguishable, or, more likely, that the cattle disease is rabies, and the finding of the *B. botulinus* a chance occurrence unconnected with the real cause of death. Further investigation of this problem is proceeding, as are cross-immunity tests with the cattle virus and the *virus fixe*.

Discussion.

Consideration of the facts adduced leaves little doubt that the virus responsible for both the human and the cattle disease is that of rabies. That this conclusion could hardly have been foreseen in the early stages of the investigation was due to the unusual form taken by the disease in the human cases and the invariable complete absence of any history of bites. Before proceeding to a discussion of these difficulties it would, perhaps, be well to summarise briefly the essential facts in our knowledge of rabies.

The symptoms of classical rabies are too well known to require mention, and it is to the histological features that we may first direct attention.

HISTOLOGICAL FINDINGS IN RABIES.

Since the description of Negri bodies (Negri, 1903) more and more trust for the histological diagnosis has been placed in the demonstration of these structures; occurring, as they do, in over 90 per cent. of the cases in man and animals (Negri Luzzani, 1913; Dwijkoff and Bogoslowskij, 1929), they are undoubtedly one of the most constant findings in the central nervous system.

Neuronal and inflammatory lesions, showing no regional affection corresponding to the site of the bite, are variable in degree and distribution; Dawydowski and Dwijkoff (1928) base their diagnosis largely on the absence of changes typically associated with other diseases. Schükri and Spatz (1925) and Lowenberg (1928) state that the intensity of the pathological processes is related to the length of the incubation period, but many other authors have failed to detect any such relation. Meningeal infiltration with lymphocytes and plasma-cells or occasionally with polymorphs (Lowenberg) is usually not marked, and this applies also to perivascular cuffing with the same types of cell. Certain modern authors (Klarfeld, 1922; Schükri and Spatz, 1925; Slotwer, 1926) find most marked inflammatory changes in the substantia nigra and midbrain, and some comment on the difficulties of diagnosis from encephalitis lethargica; others (Marchand, 1920; Krinitzky, 1926; Dawydowski and Dwijkoff; Bassoe and Grinker, 1930) place the most severe lesions in the floor of the fourth or the wall of the third ventricle, and even contrast their situation with that of the changes in encephalitis lethargica. Foci composed chiefly of proliferated microglial cells, the rabic nodules of Babes (1892) considered by him to be specific for rabies, are met with chiefly around the damaged motor nerve-cells of the brain-stem and cord. Lesions in the nerve-cells, consisting in chromatolysis, swelling, vacuolation or other degenerative changes, followed sometimes by neuronophagia, may be confined to the anterior horns of the spinal cord and the bulbar nuclei (Marchand; Lesieur, Lhermitte, and Jacquet, 1919), or may also occur in the cerebral cortex, basal ganglia or Purkinje cell layer of the cerebellum (Klarfeld, Lowenberg, Krinitzky, Dawydowski and Dwijkoff); it is, however, an interesting and important fact that the cells of the cornu ammonis containing the most numerous Negri bodies are usually comparatively intact. Cajal and Garcia (1904), Marinesco (1910), and others emphasise hypertrophy of the neurofibrils as a constant cellular abnormality in rabies; other observers (Marchand; Lesieur, Lhermitte, and Jacquet) have noted lysis of these structures. Goodpasture (1925) has described peculiar changes in the neurofibrils and mitochondria leading to the formation of Negri bodies, and Tupa (1929) swelling and disappearance of the mitochondria and of the Golgi apparatus.

The cerebro-spinal and sympathetic ganglia are frequently the seat of lymphocytic infiltration with marked destruction of nerve-cells, which are replaced by masses of small cells forming the nodules of van Gehucten and Nelis (1900); Dawydowski and Dwijkoff find the Gasserian ganglion most commonly affected. Chachina (1926) describes alterations in the sympathetic ganglia in each of ten cases. Nicolau, Nicolau and Galloway (1929) find scanty infiltrative lesions in the peripheral nerves.

It must, however, be recognised that none of these changes is necessarily an accompaniment of rabic infection; not only are many of them absent in some human cases, but in *virus fixe* infection it has long been recognised (Babes, 1912, &c.) that with increasing

* When these findings were reported to Dr. Pawan, I was informed by him that a report in similar terms had been received from Dr. Simon Flexner, of the Rockefeller Institute, to whom also specimens of the first case had been sent.—E. W. H.

affinity of the virus for the nervous system of the rabbit, lesions tend to become less and less noticeable. Examination of several cases bitten by the same animal led Dawydowski and Dwijkoff to the conclusion that individual capacity for reaction varies greatly. The species of animal infected is also responsible for variations in the histological picture; França (1925), from a comparative study of rabies in a number of different animals, concludes that the only constant lesion is hypertrophy of the neurofibrils.

PARALYTIC RABIES AS A CLINICAL ENTITY.

Turning now to less usual clinical manifestations of rabic infection, the question of paralytic rabies, which incidentally is normal in herbivora and rodents, immediately enters the field of inquiry. The occurrence of this clinical type in man has been recognised since the time of Gamaleia (1887), and though numerous cases have since been described but little can be added to his description. It is commonly held that such cases are more particularly apt to arise after extensive bites—e.g., by rabid wolves—where the infecting dose of virus is presumably very large, and after bites on the limbs rather than of the face. A study of the literature gives the impression that they occur more frequently when Pasteur treatment has failed to prevent the onset of rabies. This impression may, of course, be fallacious for two reasons: firstly, that even where prophylactic measures are abortive only the cases of atypical course are recorded; secondly, that the cases in which treatment is of no avail are most likely to be those receiving an overwhelming dose of virus. It is not irrelevant here to recall that the cases of paralytic rabies arising during or after antirabic treatment must be sharply differentiated from those of the so-called paralytic accidents, in which the lesions (Fielder, 1916; Stuart and Krikorian, 1928, 1930; Bassoe and Grinker, 1930), quite different from those of rabies, are identical with those in post-vaccinal encephalitis.

According to Gamaleia, the symptoms of paralytic rabies begin with fever, malaise, headache, and vomiting. Pain is felt usually in the bitten part, but may take the form of girdle-pain. Paresis beginning in the bitten limb is accompanied by fibrillary contractions, and rapidly increases to complete flaccid paralysis; if noted at all, sensory loss is of late development. Preceded by pains, the paralysis spreads to the other limbs, the trunk, rectum, and bladder; the face, tongue, and eyes are not spared. The respiratory centre is involved more or less late in the course of the illness, and to a greater or less degree; dyspnœic convulsions may occur, but death results from cardiac paralysis. The total duration of the malady is, on an average, seven and one-half days, compared with three days for the ordinary form of the disease. The symptoms prove that the whole of the grey matter of the cord is affected—i.e., there is a "total poliomyelitis."

Among others, van Gehucten (1908), Babes (1912), Higier (1912), Marie and Chatelin (1919), Lubinski (1921), Uribe (1924), Fedoroff (1925), Knutti (1929), Gutmann (1930), and van Wulfften Palthe (1930) have reported cases, while Remlinger (1906) accepts rabies as a cause of Landry paralysis.

These later cases have often been described under the term Landry paralysis, and have sometimes, during life, been diagnosed as poliomyelitis. Four have arisen in untreated patients; in the remainder antirabic treatment was in progress or had been completed. In the majority the bite was on the hand or leg, but in at least one (Marie and Chatelin) the boy was bitten (slightly) on the lip. As premonitory symptoms, many of the cases have shown depression or other psychical disturbance, together with pain in a leg or in the scar resulting from the bite; anxiety or depression have often been marked during the course of the illness. All evolved with ascending paralysis as the dominant clinical feature; sensory loss was definite only in Knutti's patient, and here, as will be seen later, the pathological changes were of a different order from those in the remainder. In Higier's case general hyperæsthesia was noted. In many, but not in all, retention or incontinence of urine and fæces was present. In roughly half, paralysis of the muscles of articulation and deglutition, with difficulty in swallowing, occurred during the terminal stages. Salivation was a feature of several cases. Hydrophobic spasms have been described by van Gehucten. From a perusal of his article it seems likely that here they were of psychical origin; the patient had expressed a fear of becoming rabid, and hydrophobia was elicited only by attempts to swallow water and not other liquids or saliva. In two other cases difficulty in swallowing, presumably spasmodic, appeared early in the illness. Ocular paralyses have been unusual, but have been recorded by van Gehucten and van Wulfften Palthe. In every instance death has followed within 4–12 days from respiratory or cardiac paralysis, or from a combined failure of the two vital centres, and has often been preceded by dyspnœic attacks. In most of the instances cited, the diagnosis has been confirmed by the finding of Negri bodies, by animal experiments or by both methods; in the remainder no reasonable doubt exists regarding the diagnosis.

Koch (1912) described a case of ascending paralysis accompanied by anæsthesia but without hydrophobia, and coming on during antirabic treatment. Partial recovery had occurred when two months later the patient succumbed to sepsis. Some of the animals inoculated with cord emulsion died of sepsis; the remainder died after long incubation periods of a condition corresponding to "consumptive rabies," without showing, bacteriologically or otherwise, a definite cause for death. Koch believed that the rabic virus was responsible for the paralysis.

Concerning the frequency of this form of rabies, Höyges (quoted by Babes, 1912) saw 12 cases among a total of 86, Koch 2 among 8, and Dawydowski and Dwijkoff 20 among 94. No previous author has described a series of 17 consecutive cases all of the paralytic variety, and unattended by any examples of the classical disease.

HISTOLOGICAL FINDINGS IN PARALYTIC RABIES.

The lesions in these paralytic cases are often not described, while in others they appear to have been similar to those in typical rabies.

In van Gehucten's case the cord showed no vascular lesions and only some chromatolysis of the anterior horn cells, though severe changes were found in the spinal ganglia; he comments on the lack of correspondence between clinical symptoms and pathological alterations.

Higier reported the presence in the spinal cord, and to a less extent in the pons, of marked perivascular cuffing, with diffuse lymphocytosis affecting particularly the anterior horns and following to some extent the grouping of vessels and nerve-cells; chromatolysis was evident in the anterior horn cells and in the Purkinje cells of the cerebellum, and Babes nodules existed in the pons.

In Fedoroff's case the most intense lesions, congestion, perivascular and tissue infiltration, were situated

in the spinal nerve-roots, while in the cord some perivascular cuffing was unaccompanied by abnormality in the nerve-cells; a double central canal with surrounding gliosis representing a developmental defect may have predisposed to the abortive result of treatment.

Marie and Chatelin describe the changes present in their patient as an acute infiltrative polio-encephalomyelitis. Perivascular and parenchymatous infiltration, with nerve-cell degeneration, existed alike in the spinal ganglia, grey matter of the cord, medulla and pons, cerebellar cortex, and parts of the cerebral cortex; these changes attained their maximum in the ganglia and cord. In the latter infiltration was largely nodular, with hypertrophy of neurofibrils, disappearance of the nuclei of the nerve-cells and considerable neuronophagia; anterior and posterior horns were equally involved. In the brain-stem infiltration was less marked and more diffuse. In the cerebellum the inflammation was localised to the Purkinje cell layer; in the cerebrum the cornu ammonis was particularly affected, though the nerve-cells were well preserved.

Gerlach (1925) does not record the clinical course of his case, though presumably it was of the type under discussion. He found a diffuse, in places hæmorrhagic myeloencephalitis, with complete softening of the lumbar cord. Lesions in the cord, situated chiefly in the grey matter, consisted in diffuse lymphocytic and leucocytic infiltration, massive perivascular and pericellular infiltration with advential elements and leucocytes, and all degrees of nerve-cell degeneration up to complete destruction. Inflammatory changes continued into the brain-stem and basal ganglia, where however they were much scantier.

As he claims, Knutti's observations are unique, since in contrast to the foregoing accounts he describes destructive lesions of both grey and white matter of the cord. In the lumbar region he found pial infiltration with lymphocytes and plasma-cells. In the white matter extensive diffuse destruction had left no fibres intact, and the tissues were uniformly infiltrated with lymphocytes and with mononuclear leucocytes containing phagocyted nuclear material and fat. (The illustrations suggest that the latter cells were microglial.) The vessels showed lymphocytic sheathing. Necrosis and infiltration with all stages of degeneration in the nerve-cells were seen in the grey matter; most of the large motor neurons had disappeared, and the remainder contained Negri bodies. In the posterior nerve-roots, numerous foci of destruction of axons and myelin sheaths gave rise to spaces containing granular material, lymphocytes, plasma-cells, and large mononuclears; the anterior roots showed far less severe alterations. Animal experiments were positive. In this case there was no history of a bite, and ten days prior to her illness the patient had been vaccinated against small-pox; she had had no reaction. The vaccine used was tested for rabies virus with negative results. The nature of the lesions in the nervous system, together with the presence of Negri bodies and the positive animal inoculation, seems to rule out completely the possibility of post-vaccinal encephalitis, which might otherwise have been suspected.

THE TRINIDAD DISEASE AND THE POSSIBLE VECTOR.

The cases described in the present paper are interesting for a variety of reasons. All were of the paralytic type, and in the absence of, or with failure to detect sensory changes, the earlier cases were accepted as examples of the Landry syndrome; it seems desirable that cases with this diagnosis—e.g., that of Viswanathan, 1929—in countries where rabies is common, and even in those apparently free from the malady, should be investigated experimentally.

It is very difficult to envisage a cause for the unusual clinical features. We shall shortly discuss whether, in spite of the absence of history, the patients had been bitten by rabid animals; however this may be, to escape notice the bites cannot have been deep or extensive, as they usually have been in paralytic rabies in man. Nor do the experimental results suggest that the Trinidad virus is either more or less virulent than the average street virus. Remlinger and Bailly (1930) failed to obtain evidence of the plurality of the rabic virus, which varies only in its activity and aggressivity, but the possibility of a modification of the virus in a manner analogous to that of the small-pox virus in alastrim, or in an opposite direction, must receive consideration. There is no indication in the literature that rabies takes an unusual form in races other than European, and the victims in Trinidad have belonged to two totally distinct racial stocks. Individual predisposition can hardly be a factor in each of 17 cases.

A somewhat similar modification of the symptomatology of rabies is witnessed in the "oulou fato" of dogs in West Africa; here fury, normally seen in canine rabies, is very rare, and the manifestations are almost wholly paralytic. It has, in fact, been questioned whether the disease is rabies and whether it is transmissible to man, though the work of Remlinger and Curasson (1924), Laigret (1926), Dabbadie (1930), Remlinger (1930), and others has established beyond doubt its identity. But in the exceptional cases of transmission to man, exceptional probably because the animals show little tendency to bite, there is no record of an abnormal clinical picture. Woodhead (1906) stated that, whereas in dogs generally the malady takes the paralytic form in 15–20 per cent. of cases, in Turkey nearly all cases assume this form.

The bearing of the findings of Kobayashi (1925) on the problem in hand depends on the interpretation placed upon his results. In the Japanese encephalitis epidemic of 1924, believed to be encephalitis lethargica, Kobayashi succeeded in isolating from a single case a virus capable of indefinite transmission in animals. He himself recognised its affinity with the *virus fixe*, and Cowdry (1927) demonstrated that it was in fact a true rabic virus. If the Japanese findings could be accepted unreservedly, they would indicate the ability of the rabic virus to give rise to a clinical condition differing widely from classical hydrophobia. Apart, however, from the fact that the virus was obtained from only one of a number of cases investigated, symptoms in the experimental animals did not appear until the third passage, leaving some uncertainty whether the virus originated from the human material or not.

It is unfortunate that the accident mentioned prevented a detailed histological study of the Trinidad material. In Case 2, lesions in the cord appear to be scanty, as frequently happens in this region in typical rabies. In Case 1 much more marked changes, probably as severe as those described by Marie and Chatelin and by Gerlach in their paralytic cases, are present. From the fact that many of the cords examined have shown, macroscopically, complete softening in the lumbar region, we may perhaps infer that Case 1 is in this respect the more representative

of the group. It will be interesting, if further cases occur, to see whether any of these individuals with myelitic symptoms show the unusually severe lesions described by Knutti.

Concerning the transmission of the disease in Trinidad we have no definite information. The epidemiological evidence indicates that the human affection as a whole is not directly connected with the cattle disease. Cow's milk is consumed by the native population, but there is evidence available (Mugrage, 1930) against the possibility of inducing rabies by feeding with the milk of rabid animals, so that treatment of persons drinking the milk of infected cattle is not necessary. From analogy with rabies elsewhere, we should, however, be disposed to look for a common vector of the two outbreaks. The biting of cattle by a rabid animal, especially if small and less obtrusive than a mad dog, might easily pass unnoticed; can we assume that 17 human beings might be bitten without their knowledge? The following work of Haupt and Rehaag (1921) may conceivably furnish an answer.

Haupt and Rehaag described a severe enzoötic in Brazil from 1908 onwards. In one district, between 1913 and 1918, 30 per cent. of the total horses and 15 per cent. of the cattle died of rabies. No rabid dogs were known to exist, and wholesale destruction of dogs made no impression on the case-incidence. It was then noticed that a swiftly flowing river impassable to dogs proved no barrier to the spread of infection, and that the heaviest mortality occurred in the most thickly wooded districts. Vampire bats (*Phyllostoma superciliatum*, Burmeister†) were next noticed to fly by day—an exhibition of quite abnormal behaviour; cattle bitten by these bats afterwards developed rabies. Finally, experimental investigation of a bat caught biting a cow confirmed the supposition that these creatures were the vectors.

It may be that here we have the clue to the origin of the Trinidad epidemic, and investigation along this line is proceeding. Vampire bats occur in the island, which lies within a short distance of the mainland of South America, and are known to bite men and animals; in explanation of its illness, the owner of the cow from which rabic virus was isolated stated that "bats had sucked the life out of the animal." Moreover, a bat may bite a person during his sleep without his being aware of the occurrence, and the toe is a common site for the trauma; we might thus account alike for the absence of history of bite and for the frequency, as the initial symptom, of paræsthesiæ in the foot. In connexion with the cattle disease, it has many times been remarked that removal of the herd from pasture to stall results in cessation of the epidemic; this was previously attributed to its removal from an area infested with *B. botulinus*, but, since lanterns are always kept burning in the stalls to scare away bats, an alternative explanation is forthcoming. If the outbreak is finally traced to bats, is it possible that passage of the virus through that animal's tissues has in some way modified its pathogenic action for man, so that it now produces only cases of paralytic type? Should the present line of inquiry yield negative results, it seems that we must search for a new and hitherto unrecognised mode of transmission of the disease.

In conclusion, we must acknowledge our indebtedness to Sir Wilfred Beveridge for placing his notes freely at our disposal, and to Dr. W. M. Scott for a supply of *virus fixe*.

† Captain J. G. Dollman, of the Natural History Section of the British Museum, kindly informs us that the blood-sucking vampire bats belong to three genera—desmodus, containing the common South American vampire *D. rotundus* and the Central American *D. rufus*; diœmus, from South America; and diphylla, from Brazil. The blood-sucking bat of Trinidad is the *D. rufus*.

Summary.

An outbreak of human rabies, which in each of 17 cases took the paralytic form, is described; in no instance is a history of bite by a rabid animal forthcoming.

The simultaneous occurrence of rabies in cattle is reported.

Epidemiological evidence does not suggest a direct connexion between the human and the cattle disease.

The opinion that the vector in both cases may be the vampire bat is tentatively expressed.

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ST. JOHN AMBULANCE BRIGADE.—Last year members of the brigade attended 451,370 cases of accident and sudden illness. In his annual report Sir Percival Wilkinson, acting chief commissioner of the brigade at home, states that at the end of last year there were 1794 divisions and a personnel of 55,121, while 362 cadet divisions had a membership of 7356. The net increase in strength during the year was 103 divisions, 2752 members, 203 cadet ambulance divisions, and 343 nursing divisions. The work has increased with especial rapidity in London, and in the past two years the strength of No. 1 (Prince of Wales's) District has consequently been augmented by 1171 members.

SHOULD HIGH BLOOD PRESSURE BE REDUCED?

BY I. HARRIS, M.D. KÖNIGSBERG,
HONORARY PHYSICIAN, LIVERPOOL HEART HOSPITAL;
AND
C. L. G. PRATT, M.D. LIVERP.,
MAURICE STERN RESEARCH FELLOW.

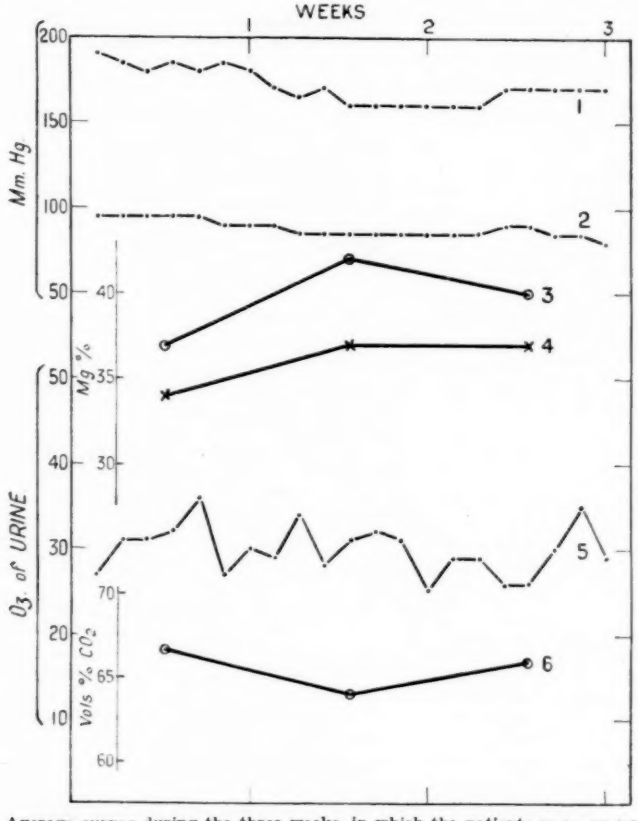
THE question whether high blood pressure ought or ought not to be reduced is of great practical importance. An attempt has been made here to decide it by an experimental method. The idea underlying the investigation is to reduce the pressure artificially and to determine the cardiac reserve power as well as the renal function under the altered conditions.

Twenty-two patients were put on a standard diet, which was rigidly enforced for three weeks. During the first week no drugs were given; during the second week pressure-reducing drugs were administered; in the third week again no medicine was given. Collosol sulphur (Crookes), 3 c.cm. daily, was injected intramuscularly in the majority of cases; the effect of this drug on pressure is both profound and lasting. Erythrol-tetranitrate was, however, employed in some cases. The following tests were applied each week: water-excretion test, water pituitrin excretion test, blood-urea, blood non-protein nitrogen, blood uric acid, alkali reserve, blood chlorides, chloride concentration test, blood phosphates, and ammonia coefficient.

TABLE I.

Case.	First week.				Second week.				Third week.			
	Systolic Bp.			N.P.N.*	Systolic Bp.			N.P.N.*	Systolic Bp.			N.P.N.*
	Max.	Min.	Av.		Max.	Min.	Av.		Max.	Min.	Av.	
1	200	170	180	36	170	155	163	40	180	160	165	36
2	225	225	225	41	215	190	200	46	225	225	225	42
3	185	145	165	35	160	120	140	39	180	130	145	37
4	—	—	—	31	—	—	—	40	—	—	—	35
5	120	100	115	35	115	105	110	36	110	100	105	32
6	190	145	170	36	140	90	120	40	150	130	140	40
7	205	190	195	34	220	150	190	42	175	145	160	38
8	—	—	—	38	—	—	—	38	—	—	—	36
9	190	165	175	37	170	140	160	44	170	135	150	43
10	220	180	200	39	185	170	175	45	185	170	175	47
11	240	180	220	40	226	150	185	35	—	—	—	35
12	—	—	—	36	—	—	—	45	—	—	—	40
13	165	145	150	34	140	115	133	38	155	140	150	35
14	180	145	160	35	170	130	147	35	160	135	150	35
15	170	160	165	43	170	140	155	48	155	145	150	39
16	150	120	133	36	145	110	127	42	135	120	127	40
17	270	240	250	49	250	200	225	70	260	235	240	55
18	195	170	180	37	170	155	165	42	180	150	170	38
19	185	140	157	39	170	140	152	47	140	135	140	42
20	150	140	145	40	135	120	123	46	145	120	130	45
21	210	190	197	38	200	140	170	49	210	175	195	37
22	195	180	183	33	175	145	158	38	170	140	160	39

* Expressed as mg. per cent. nitrogen.
Av. = Average.



Average curves during the three weeks in which the patients were under observation. 1 = systolic blood pressure. 2 = diastolic blood pressure. 3 = non-protein nitrogen. 4 = blood-urea 5 = urinary output. 6 = alkali reserve.

RESULTS OF TESTS.

Water excretion was normal in all the cases under review as long as no pressure-reducing drugs were employed. During the period in which patients were under the influence of pressure-reducing drugs the great majority of cases showed a marked reduction in the water-excretion power. In one instance, however, there was an increase in the water excretion in the second week when the patient was under the influence of the pressure-reducing drugs. The drug employed in this case was erythrol-tetranitrate, which, as already seen, does not exercise a lasting effect on pressure.

Perhaps as significant a fact as any is the marked reduction in urinary output during the period the patient was under the influence of pressure-reducing substances. The reduction is particularly marked in cases of polyuria. It is clear that such an elementary function as water excretion becomes depressed in cases where pressure-reducing drugs are employed.

Blood-urea was increased in all cases during the period of observation when the patient was under the influence either of collosol sulphur or of erythrol-tetranitrate, 40 mg. of urea per 100 c.cm. of blood being considered the limit of normal blood-urea values. In the first week all cases but two showed normal blood-urea content. Under treatment, there were actually eight cases which showed an abnormally high blood-urea of 40 mg. upwards. It is obvious that there is definite urea retention in cases of high blood pressure after the administration of pressure-reducing drugs.

Non-protein Nitrogen.—There was only one patient out of 22 who did not show an increase of non-protein nitrogen when under the influence of pressure-reducing drugs. This patient showed also an increase of alkali reserve when under the influence of

pressure-reducing drugs. Non-protein nitrogen retention is doubtless evidence of functional failure of heart or kidney; for the purpose of this paper it does not matter which.

Alkali Reserve.—This test represents the buffer value of blood plasma. If free acids stronger than carbon dioxide are produced in the body they replace it from combination with the buffer salts and so diminish the alkali reserve power. As is well known, under normal conditions the kidney excretes a large amount of acids in order to maintain the pH equilibrium. A failure on the part of the kidney to excrete the acids would thus lead to a diminished alkali reserve.

Alkali reserve was generally diminished as a result of the administration of pressure-reducing drugs. In the great majority of instances there was retention of uric acid, phosphates, and chlorides, and the chloride excretion test was depressed.

The figure shows the average variation in blood pressure, non-protein nitrogen, blood-urea, urinary output, and alkali reserve in the 22 cases over the three weeks' test period.

CARDIAC CONDITION AND PRESSURE-REDUCING DRUGS.

The cardiac power was tested the first week, when the systolic pressure remained normal, and the second week, when it was reduced. There are a number of reactions practised at the Heart Hospital[1] which give a definite indication of the cardiac condition. Foremost among these is the relation of stroke volume at rest to stroke volume at work. It was found in the normal heart that the stroke volume (cardiac output per beat) is greatly increased as the result of exercise. In the diseased heart, on the other hand, the increase is only moderate or is absent. The same standard test was used in all cases. Similarly the cardiac output per minute after work is larger in health than in disease. Another important test refers to the time in which the oxygen consumption becomes normal after the standard exercise. The shorter the period in which the oxygen consumption becomes normal the better the condition of the heart.

TABLE II.—*Cardiac Output and Stroke Volume under Conditions of Reduced and Unaltered Pressure.*

Case.	Before and after reduction of pressure.	During rest. A = Cardiac output per minute in litres. B = Stroke volume in c.cm.		After standard exercise. A = Cardiac output per minute in litres. B = Stroke volume in c.cm.		Requirement in c.cm. of oxygen.	Time after exercise in minutes when oxygen consumption becomes normal.
		A	B	A	B		
18	Before.	5·4	72	10·5	100	1916	12
	After.	5·5	62·5	8·96	74	2172	20
22	Before.	4·8	53	9·9	97	1752	12
	After.	4·5	48	7·5	64	2290	16
19	Before.	5·8	56	11·4	95	1132	11
	After.	4·7	50	8·7	78	1668	12
6	Before.	5·6	54	11·5	108	2016	8
	After.	4·6	50	8·8	97	2132	12

Yet another important reaction refers to "requirement." By this term is understood the cost of oxygen which a standard exercise entails. The worse the condition of the heart, the greater the consumption of oxygen. Table II. gives a clear indication of all these reactions in the first week, when the systolic pressure was not disturbed, and in the second week, when the pressure was reduced.

These tests prove conclusively that the heart suffers definitely as a result of treatment by pressure-reducing drugs. This result is not difficult to understand, as an adequate pressure in the aorta is of vital importance for the coronary circulation.

Various attempts have been made to seek the cause of hypertension in various substances circulating in the blood, but with little success. Might it not be an endeavour on the part of the organism to keep the blood chemistry within normal limits? This may be the reason why nothing really abnormal is found in the blood chemistry as long as the blood pressure remains high. It is only when the pressure is reduced artificially, and thus a condition of artificial heart failure brought about, that there is abnormal retention of substances in the blood in these cases.

CONCLUSIONS.

(1) The water-excretion function is definitely depressed as a result of administration of pressure-reducing drugs. (2) There is retention of urea, non-protein nitrogen, phosphates, and chlorides in the blood as a result of pressure-reducing drugs, while the alkali reserve is generally lowered. (3) The cardiac function is definitely impaired as the result of the treatment. (4) The conclusion is that it is not desirable to administer pressure-reducing drugs as routine treatment in cases of hypertension.

The cardiac output determination was done by one of us (I. H.) and Dr. I. J. Lipkin.

[1] Edin. Med. Jour., September, 1931.

IODINE POWDER IN THE TREATMENT OF CHRONIC OTORRHŒA.

BY N. ASHERSON, M.B. LOND., F.R.C.S. ENG.,

ASSISTANT SURGEON TO THE CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL; SURGEON FOR DISEASES OF THE EAR, NOSE, AND THROAT TO THE QUEEN'S HOSPITAL FOR CHILDREN.

IODINE powder, consisting of a 1 per cent. intimate suspension of iodine crystals in boric acid, is a valuable adjunct to the treatment of chronic uncomplicated suppurative otitis media associated with a marginal perforation and granulations. This type of case invariably proves resistant to ordinary conservative treatment and an operation is the usual advice profferred. The powder is one highly spoken of by American otologists.[1] It is termed iodine powder because the iodine is the active principle and the boric powder chiefly the vehicle for application. It is made by grinding up iodine crystals with boric acid in a mortar.

In deciding what line to adopt in the treatment of quiescent chronic uncomplicated otorrhœa, it is necessary to divide the cases into certain clinical groups: (1) Those with a central perforation of adequate size in the tympanic membrane. These cases, with one or two exceptions, can be cured instantly and dramatically by a single ionisation with zinc sulphate. (2) Cases with a marginal perforation—a large number of these cases can be cured by treatment with iodine powder. (3) Cases of cholesteatoma, for which operation is indicated. (4) Cases with an

[1] Lederman, M. D.: Laryngoscope, 1930, xl., 397.

intact tympanic membrane but with fistula into the mastoid process, on the posterior or superior wall of the osseous meatus. A mastoid operation will be necessary for this class.

TREATMENT OF THE MARGINAL PERFORATION.

The tympanic membrane has a perforation, which extends to and involves the annulus tympanicus and is associated with granulations, which are sessile, pedunculated, or may be simulated by pouting mucous membrane. The posterior superior quadrant is the common site. After thorough cleansing of the meatus, it is often possible to aspirate secretions from the attic. The meatus is thoroughly cleansed by syringing and mopping. All adherent sloughs are removed and the pent-up secretion aspirated with the Siegle speculum. Any large granulation is removed after the application of cocaine and adrenalin. The meatus is filled with absolute alcohol for ten minutes and then thoroughly dried by mopping. A 1 per cent. iodine in boric acid powder is insufflated into the meatus, filling it completely. The patient is instructed not to touch the ear, except to mop out any discharge with a cotton-wool applicator. He is seen at intervals of four days at first, but later at intervals of seven days, when the ear is again insufflated with the iodine powder without any further preliminary treatment with alcohol. This is repeated until the ear heals—usually within two months.

The treatment is painless and the iodine does not produce any effect on the skin of the meatus. If the powder is still to be seen at the weekly visit, the discharge has diminished to a minimum or has ceased completely. To obtain a view of the tympanic membrane it will then be necessary to remove the powder by syringing. If the lesion is present (in the early stages it is often present but quiescent, presenting a pale picture, compared with its congested red appearance at the commencement of treatment) the powder is again insufflated. If there is any doubt whether there is any discharge or not, the powder test should be applied. This consists of insufflating boric powder and seeing the ear next week. The presence of the powder, undisturbed and snow-white, is proof positive of the absence of any discharge in the interim.

Effects of the Iodine Powder.—The profuse discharge rapidly abates, often after the first application, the ear remaining free from any overt discharge. Thus, as far as the patient is concerned, a "cure" of the otorrhœa has been wrought. He is freed from a troublesome discharge and is rid of the ritual of a daily aural toilet. Though at this stage otoscopy would reveal the absence of any powder and the focus is still active, the patient is delighted with the results. Parents are pleased that no active treatment is required from them at home. The fœtor of the discharge will disappear, and within a week or two the otorrhœa becomes inodorous, gradually muco-purulent, mucoid, and, in successful cases, finally ceases completely. The sessile granulations shrink up, as does the œdematous prolapsed mucous membrane pouting down from the attic region and from the periphery of the perforation. A rapid epithelisation occurs, and within a few weeks will be complete.

I have repeatedly observed a cure of the otorrhœa in cases with a marginal perforation with granulations. Many of these cases had failed to react to all other forms of active treatment and it appeared that only operation was left, yet the iodine powder cleared up the condition. It is interesting that these cases heal by migration inwards of the periphery of the perforation, so that the latter assumes a central position, where it may remain patent or may completely close over.

I have also found the powder cure cases where there has been a central perforation, but not with the dramatic effect of zinc ionisation. Cases of central perforation with granulations on the periphery of the perforation are cured by the powder.

If there is any active discharge the powder never cakes or obstructs. It acts as a sponge, absorbing secretions. It only remains in situ if the discharge has ceased.

REPRESENTATIVE CASE REPORTS.

CASE 1.—A boy, aged 7, had had right and left ear discharge for two years, with occasional bleeding from the right ear but no pain. When seen on Nov. 24th, 1930, he had septic tonsils and adenoids. The right meatus was full of offensive pus: when this was removed a marginal perforation, situated in the upper posterior quadrant of the drum, was seen. Excessive granulations surrounded and occluded the perforation, which involved the annulus tympanicus. Secretions could be aspirated with the Siegle speculum.

The ear was cleaned and dried. Absolute alcohol was applied for ten minutes; the excess was mopped away and the meatus filled with 1 per cent. iodine in boric acid powder. On Dec. 1st no discharge was complained of, and the meatus was moist. It was filled again with iodine powder. On Dec. 8th there was no discharge, but there was no trace of the powder in the meatus. Silver nitrate was applied to the granulations, and iodine powder again applied. On Dec. 15th the ear was dry and iodine powder was reapplied. On Jan. 12th, 1931, the ear was dry, and on Jan. 26th the perforation was healed, and the child heard normally.

He had also had pus in the left meatus, the condition being the same as in the right ear, with attic granulations. The treatment was identical with that of the right ear, and within the same period the discharge had dried up completely and the perforation had healed.

No treatment is carried out in the interval between the attendances, but the frequency of insufflations must depend on the rapidity with which the discharge appears.

CASE 2.—A girl, aged 9, had had purulent, offensive discharge from the right ear, but no pain, for 12 months. She had had her tonsils and adenoids removed six months previously. When seen on Nov. 4th, 1930, she had a marginal perforation occupying the postero-superior quadrant of the tympanic membrane and annulus, surrounded by exuberant granulations, from which, after the ear had been thoroughly cleaned, offensive secretions, indistinguishable from cholesteatomatous debris, could be aspirated with the use of the Siegle speculum. Absolute alcohol was applied for ten minutes; the meatus was dried and filled with iodine powder. On Nov. 11th there was marked improvement; the pus was not so profuse in amount and not offensive. The meatus was again filled with iodine powder. On Nov. 18th there was no discharge, and the meatus was moist. Iodine powder was reapplied then, and again on Dec. 2nd and 9th. On Jan. 27th, 1931, the ear was dry, a dry perforation remaining.

CASE 3.—A girl, aged 11, had had purulent discharge from both ears continuously for seven years. There was no pain. She had been attending the out-patient department of a teaching hospital for months, but had never had tonsils or adenoids removed. When seen on May 9th, 1930, both ears had the meatus full of offensive pus. This was cleaned. Adherent offensive slough occupied the depth of the meatus, deep to which the entire meatus was occupied by a perforation which extended to the annulus tympanicus in all visible directions. Granulations pouted from the margins, and pus could be aspirated from the attic. For the three subsequent months she was treated with repeated zinc ionisations with little effect, the meatus being found to have a purulent slough in its depth each week. It was decided to advise operation. When the iodine powder treatment came under my notice this case was one of the earliest put on it. In the meanwhile the tonsils and adenoids were removed. On Sept. 12th the condition of both ears was the same as in May. Alcohol was applied for ten minutes, followed, after drying, by the iodine powder. This was repeated each week to both ears for six weeks, at the end of which period both ears were completely free from discharge. The patient was seen again in December, 1930, when the ears were dry and there was a complete *restitutio ad integram* of both tympanic membranes. The mother commented on

the fact that this was the first time for seven years that the ears had ceased from discharging. Six months later the ear were still dry.

CASE 4.—A woman, aged 28, had had discharge from the left ear for many years, necessitating a daily aural toilet to keep the ear clean and free from odour. There was no pain. A perforation was observed through Shrapnel's membrane, marked by the usual sentinel granulations and extending on to the roof of the osseous meatus. It was covered by a yellow adherent slough, and a bent probe detected bone. The granulations could be sucked out of the perforation. Alcohol was applied, followed by iodine powder, and the treatment was repeated on Sept. 27th. One week later the ear had not run in the interval, though there was no trace of any powder left in the meatus. The powder was insufflated at weekly intervals, and within a month the ear ceased to discharge, and the patient was very impressed. The ear dried up completely.

I have treated over 300 cases with very gratifying results. The vast majority of these cases were between the ages of 5 and 15. Unfortunately, it is not possible to foretell which cases will respond to the iodine powder treatment or which will prove a failure. Many cases respond, much to the observer's surprise; while others, in which a good result should ensue, fail. But the treatment is well worth a trial before recourse to the radical operation.

CLINICAL AND LABORATORY NOTES

CASE OF ASBESTOS-LIKE BODIES

IN THE LUNGS OF A COAL-MINER WHO HAD NEVER WORKED IN ASBESTOS.

BY FRANK E. TYLECOTE, M.D., F.R.C.P. LOND., D.P.H.,

PROFESSOR OF SYSTEMATIC MEDICINE IN THE UNIVERSITY OF MANCHESTER; HONORARY PHYSICIAN, MANCHESTER ROYAL INFIRMARY;

AND

JOHN SHAW DUNN, M.D. GLASG.,

PROCTER PROFESSOR OF PATHOLOGY AND MORBID ANATOMY IN THE UNIVERSITY; SENIOR HONORARY PATHOLOGIST, MANCHESTER ROYAL INFIRMARY.

IN March of this year a man, aged 71 years, was seen in consultation with a doctor ten miles from Manchester, and was later admitted to the Manchester Royal Infirmary under the care of one of us (F. E. T.). The doctor who had attended him reported that he had had several attacks of hæmoptysis in the preceding month, but as several recent sputum tests had had negative results the case had not been accepted by the local tuberculosis authorities.

The man himself said he was a coal-miner, and had as a young man worked in Alabama in mines. On consulting books of reference it was found that no asbestos is found in Alabama, which is noted for coal and iron, "Alabama iron" being famous all the world over. In 1923 it is stated that 80 per cent. of the asbestos produced came from that part of Quebec which is south of the St. Lawrence. Alabama and Lancashire mines were the only mines he had ever worked in. These points later became of interest and importance owing to the curious findings at the post-mortem and in the histological examinations of portions of tissue removed thereat, and later examined by one of us (J. S. D.).

On examination on admission to the hospital the man was very thin, obviously much emaciated, and very weak. There was a history of typhoid fever in December, 1929, and of operation for a strangulated inguinal hernia in December, 1930, since which time his health had never fully recovered. On Feb. 19th, 1931, he had his first hæmoptysis, spitting up "about four pints" of blood, while a few hours later a second hæmoptysis occurred. A cough had been constant since then, whilst the sputum remained blood-tinged and night sweats occurred. A week before admission a rigor occurred, and delirium followed, and persisted up to the time of admission. Examination of the chest showed nothing abnormal on the left side beyond the presence of a few râles and rhonchi over the lower part of the left lung behind. On the right was massive dulness, more marked below. Well below the apex at the back and to the outer side were signs of cavitation. The area of dulness surrounding the area of cavitation gave no evidence of softening to auscultation, but there was rather an absence of breath sounds. Low down in the right axilla friction was heard. A tentative diagnosis of pulmonary tuberculosis was made, with possible new-growth supervening. In the next 48 hours a positive sputum test was obtained. A blood Wassermann taken about this time was negative. The Widal reaction was positive to *Bacillus typhosus* 1 in 160.

Radiographic examination of the chest reported: "As the patient was unable to sit up satisfactory examination was impossible. The film taken shows displacement of the heart and mediastinum towards the right side. There is a large irregular opacity in the right lower chest, with mottling in the upper and middle lobes. There is some mottling also visible in the left middle and lower lobes. The appearances are not typical of tuberculosis, ? neoplasm."

The urine contained a trace of albumin. The pulse-rate at first was 90–100, but later rose to 116–120. The range of temperature was morning, 98°; evening, 99°–100°. He gradually got weaker, and died on April 14th. The autopsy was held on the 15th.

A synopsis of the post-mortem findings follows, with a description of the histology and some notes on these findings by one of us (J. S. D.).

REPORT OF AUTOPSY.

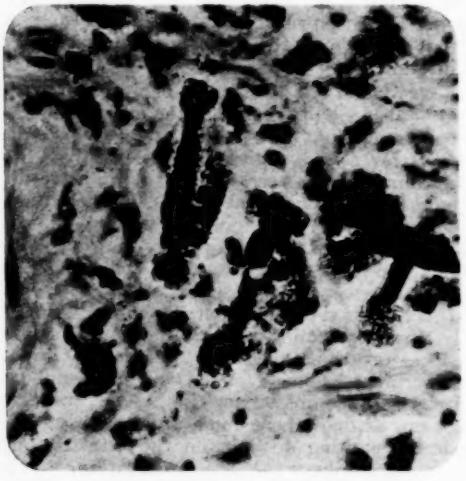
Lymph glands: Thoracic and abdominal glands along spinal column are heavily anthracosed.

Pericardium: About 100 c.cm. excess fluid.

Heart (400 g.): Enlarged; myocardium, hypertrophy, more marked right side; tricus. V, three fingers; mitral V, two fingers; aorta, early atheroma.

Right and left pleuræ: Each 500 c.cm., straw-coloured fluid. Right lung (900 g.): Whole of lower and lower half of upper lobe are firm, almost black with white mottling, and at apex of lower lobe a cavity containing

FIG. 1.



Asbestos-like bodies in the lungs, showing forms, with rounded ends. In Fig. 3 the central core can be clearly distinguished. (× 500.)

a ruffled wall and evidence of tubercle. Left lung (1360 g.): Lungs showed some degree of softness, as though some neoplastic invasion were present. Both lungs heavily anthracosed. Left consolidated only in its lower lobe. No abnormalities evident in air passages. General appearances suggest a chronic fibroid tubercle, possibly associated with a neoplasm.

Stomach: Nil. Small intestine: Some small tuberculous ulcers in lower ileum. Large intestine: Tuberculous ulceration of cæcum.

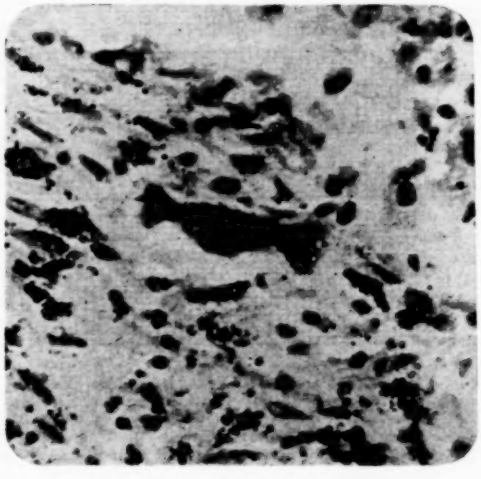
Liver (1600 g.): Moderate passive congestion. Pancreas: Nil. Spleen (340 g.): Enlarged and moderately firm. Hyperplasia and congestion. Thyroid: Nil. Adrenals: Nil. Right kidney (160 g.): Congested. Left kidney (160 g.): Congested. Urinary bladder: diverticula present. Genital glands: Middle lobe of prostate quite appreciably enlarged.

Anatomical diagnosis: Chronic fibroid tuberculosis of lungs. Pulmonary asbestosis.

HISTOLOGICAL EXAMINATION.

The extensive consolidation of the lower lobes of both lungs was found to be due to caseating tuberculosis with a very diffuse distribution; it appeared to represent a rapid lymphatic spread, and in large areas it completely obscured the lung-structure. Tubercle bacilli were present in moderate numbers.

FIG. 2.



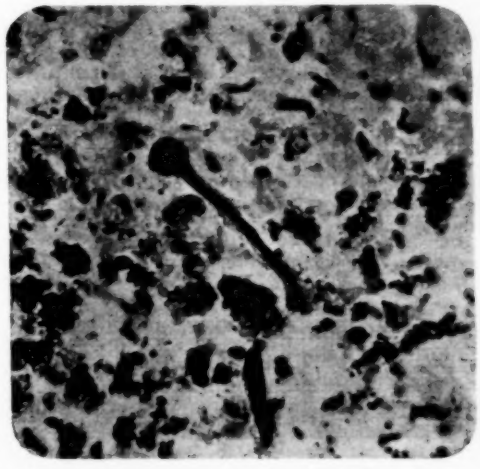
There was fairly marked anthracosis, the pigment in fine granules, being mostly aggregated in the peribronchial connective tissue.

The upper parts of the upper lobes were almost free from tuberculosis, and so it was possible to recognise a moderate patchy overgrowth of fibrous tissue in these areas. This was mature in type, but not very dense, and did not form laminated nodules. Here and there in the fibrous tissue were scattered some minute brownish bodies singly or in groups of five to ten (Figs. 1 and 2). They were mostly slender rods with bulging ends, and they measured from 30 to 70 microns in length by 2 to 5 microns in thickness. On high-power examination, it could be seen that most of these bodies had a black opaque central core, while the brown material formed an outer lamina and was semi-transparent (Fig. 3). There was no appearance of the regular segmentation which commonly occurs in asbestos bodies. On treatment with potassium ferrocyanide and hydrochloric acid, the brown material took on an intense blue colour, evidencing an abundant content of free iron. The bodies were subsequently recognised in all parts of the lungs, though nowhere numerous.

COMMENT.

The main point of interest in the case is the occurrence in the lungs of bodies which somewhat resemble those that have been described in the lungs

FIG. 3.



of asbestos workers. They simulate these in size and general shape, especially in the rounded swellings at the ends; in colour; and in their abundant content of free iron. They differ from the familiar asbestos bodies in being usually coarser and less regular, in possessing a black core of opaque material, and in the absence of any appearance of segmentation. It is presumed that they are minute fragments of some other iron-containing mineral, which have been inhaled into the lungs and undergone some chemical change under the influence of the tissue fluids resulting in the formation of a peripheral lamina from the iron-containing part. They do not appear to have caused a very serious fibrous reaction in the lungs in this case.

GALLOP RHYTHM:

ITS CLINICAL SIGNIFICANCE IN CERTAIN CASES.

BY C. BLAXLAND LEVICK, M.B. SYDNEY, M.R.C.P. LOND.,

ASSISTANT PHYSICIAN AND PHYSICIAN-IN-CHARGE OF CARDIOGRAPHIC DEPARTMENT, ST. GEORGE'S HOSPITAL; PHYSICIAN TO OUT-PATIENTS, VICTORIA HOSPITAL FOR CHILDREN.

GALLOP rhythm has long been known to be a serious cardiac sign. The name is best reserved for the true gallop rhythm where the first heart sound is reduplicated (ᴗᴗ—); for, in agreement with Gee's teaching, a doubling of the second sound (—ᴗᴗ) is properly termed canter rhythm. It is important to differentiate between the two, for canter rhythm is heard in many conditions none of which is as serious as those which yield gallop rhythm. These two rhythms are easily confused, for even a slight degree of tachycardia may appear to accentuate the middle component of the three (ᴗ—ᴗ); and during the varying phases of respiration this accentuation will seem to move sometimes to the third component (ᴗᴗ—), sometimes to the first (—ᴗᴗ).

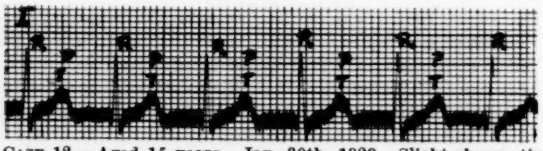
It is here desired to draw attention to a special variety of gallop rhythm, and to emphasise the importance of its recognition. For according to the

age at which it appears it may be the only sign which either allows for the provision of adequate treatment or leads to a correct diagnosis and a more clear prognosis. This special variety is a reduplication of the first sound, clearly heard, over a small area close to the left border of the sternum at the second intercostal space or third cartilage. In many cases it will be heard at all the auscultatory areas; but if it is not audible at this localised spot, it is unlikely to be heard elsewhere. There are, of course, many cases where gallop rhythm is heard at the mitral area, yet not at the base; these belong to a different category.

ACUTE RHEUMATISM.

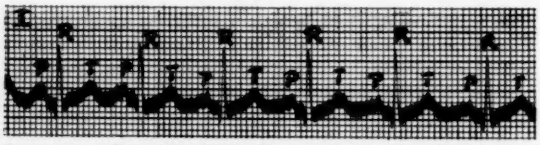
The significance in acute rheumatism varies with the age of the patient. In children and young persons it is almost always associated with delayed conduction from auricle to ventricle, the electrocardiogram showing a lengthened P–R interval. These two features, gallop rhythm and long P–R interval, are frequently the earliest evidence of rheumatic carditis. Tachycardia, about 120 per minute, is usually present, while the temperature may not be raised above 99° F. The discovery calls for immediate rest in bed; the earlier this is obtained, the more quickly does the P–R interval close. Administration of full doses of salicylates in addition appears to hasten the closure. If treatment is delayed or imperfectly carried out, the P–R interval may remain permanently longer than normal, and the gallop rhythm will then persist.

FIG. 1.



CASE 12.—Aged 15 years. Jan. 30th, 1929. Slight rheumatic pains. Gallop rhythm and tachycardia present; no other abnormal cardiac signs. Lead I. rate = 114. P. and T. fused. P–R = about 0·31 sec.

FIG. 2.



Same case.—Feb. 12th, 1929. No symptoms. No gallop rhythm. Rate = 95. P–R = 0·20 sec.

It is probable that the lengthened P–R interval is due to an infiltration of the auriculo-ventricular junction rather than to vagal effect, for atropine produces no alteration except in occasional cases. However, the effect of atropine on the P–R interval is a complex one, and as yet imperfectly understood. Sound-photographs seem to show that the earlier of the two short components is produced as a result of auricular contraction occurring outside its usual timing in the cardiac cycle.

Eighteen cases of this nature have recently been observed in patients under the age of 25 years. In each case a lengthened P–R interval was confidently predicted prior to electrocardiogram. Confirmation was clearly obtained in 17 cases; the eighteenth proved within normal limits. With early treatment, serial electrocardiograms on successive days revealed a rapid closure of the P–R interval; pari passu the gallop rhythm became less clear. Consequently, for purposes of confirmation it is necessary to take an electrocardiogram on the same day on which the gallop rhythm is clearly heard. Figs. 1 and 2 are electrocardiograms from a typical case.

CASE 1.—Girl, aged 15, seen in out-patient clinic at St. George's Hospital, on Jan. 30th, 1929, complaining of mild rheumatic pains in legs and arms; headaches; easily fatigued. No breathlessness or cyanosis. No history of scarlet fever or definite rheumatic fever. On examination, tachycardia, 116, persisting with rest and not due to nervousness. Temperature normal. Heart normal in size, regular rhythm; sounds normal except for reduplication of the first sound at the second left interspace near the sternum; no murmurs. Clinical diagnosis: First degree A–V block, probably rheumatic. Confirmed by electrocardiogram (Fig. 1) on same day. Admitted to hospital for rest in bed, no special treatment. Heart-rate gradually slowed, gallop rhythm became less clear. On day after admission, atropine sulphate gr. 1/25, subcutaneously, produced no effect on the P–R interval. Feb. 12th: Clinically normal, no gallop rhythm. Electrocardiogram normal (Fig. 2). November, 1930: Signs of early mitral stenosis. Electrocardiogram: P–R normal.

Effective treatment was denied to another girl in the first instance, owing to the true nature of her trouble being unrecognised. Now after several years' observation, gallop rhythm is still in evidence and the P–R interval remains abnormally long.

CASE 2.—Girl, aged 10, came to out-patient clinic at Victoria Hospital on May 6th, 1927, complaining of fainting attacks with loss of consciousness for 3–5 seconds. Scarlet fever at age of 7. No rheumatic history. On examination pulse 120, persistent, regular. Temperature normal. Heart normal in size. Apical first sound loud and slapping. First sound reduplicated at pulmonary area. Electrocardiogram confirmed clinical diagnosis of first degree rheumatic A–V block. P–R = 0·23 second for rate = 125 per minute. The parents refused admission to the Victoria Hospital and sought advice at another hospital, where apparently the nature of her trouble was not recognised, and no rest was ordered.

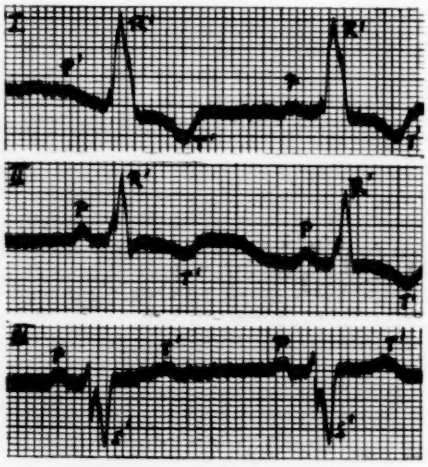
April, 1928: Returned to Victoria Hospital, still suffering from fainting attacks. Gallop rhythm still present. Electrocardiogram: P–R = 0·24 second for rate = 110 per minute.

No subsequent treatment, however, has been effective, and the clinical state and the electrocardiogram remain practically unchanged at the present time.

BUNDLE-BRANCH BLOCK.

In adults of middle age and older this form of gallop rhythm usually indicates a block in one branch of the bundle of His. It is more clearly heard when the right branch (old nomenclature) is affected. Fig. 3 is the electrocardiogram from a case of this

FIG. 3.



nature, following a correct clinical diagnosis based on gallop rhythm heard clearly at the second left interspace, and at no other place; there was here no other clinical feature to suggest the diagnosis. Sound-photographs seem to indicate that in these cases the two short components are due to a slight asynchronism in the closure of the mitral and tricuspid valves.

Of 25 recent cases of bundle-branch block (B.B. block) gallop rhythm was clearly heard in 20; in the remainder the first sound in the second left interspace was not distinctly doubled, but was prolonged. Of the 20 cases with gallop rhythm, 12 were at the time practically symptomless; routine examination revealed the doubled first sound, suggesting a diagnosis of B.B. block prior to its confirmation by electrocardiogram. In other cases electrocardiogram revealed B.B. block when no doubling of the first sound had been observed; re-examination then showed a distinct reduplication in several of them. A definite diagnosis of B.B. block does not indicate any special treatment, but it certainly defines the prognosis more clearly than would be otherwise possible.

It is not contended that gallop rhythm is heard in all cases of first degree A–V heart-block and of B.B. block, nor that all cases of gallop rhythm yield an abnormal electrocardiogram. Rather is it claimed that its recognition in many cases may be of the utmost importance to prognosis and treatment.

BRITISH MEDICAL ASSOCIATION.

ANNUAL MEETING IN EASTBOURNE.

SECTION OF NEUROLOGY AND PSYCHOLOGICAL MEDICINE.

Dr. H. CRICHTON-MILLER took the chair at a meeting of this section when Dr. W. A. CALDWELL gave a survey of probable prognostic factors in the treatment of

General Paralysis.

Pyrexia induced by malaria remained, he said, the most satisfactory method of treatment of general paralysis. Its value was enhanced by a short course of tryparsamide before inoculation and by the administration of N.A.B. after the malarial infection had been terminated. In general it was true that the younger the patient the better the prognosis, but age was not of paramount importance, and improvement might occur in the elderly. Nevertheless 71 per cent. of patients who were discharged from mental hospitals in a satisfactory condition were under 40 years of age. In women who had borne children the prognosis as to discharge from hospital was better than in nulliparous women. The character of the mental symptoms present was an indication as to the probable response to treatment. The expansive grandiose patients, who in his experience were the commonest, did best, and the juvenile and depressed paretics worst. In the case of the simple dements the outlook was moderately good. Dr. Caldwell stressed the importance of early treatment after the onset of symptoms of general paralysis. Those subjected to treatment during the first five months of their illness yielded the best results. There appeared, however, to be no relationship between prognosis and the incubation period which intervened between the primary infection and the development of general paralysis. He had observed a number of cases in which the Wassermann reaction had been negative in the blood but positive in the cerebro-spinal fluid.

Dr. F. R. P. TAYLOR said he had experienced some difficulty in inoculating women with malaria. He inquired as to the advisability of infecting with malaria a paretic woman who was pregnant.

Dr. C. WORSTER-DROUGHT had found the demented type of paretic to be commoner that the grandiose. He questioned the occurrence of a negative Wassermann reaction in the blood in general paralysis, and emphasised the importance of a paretic Lange curve in the cerebro-spinal fluid.

Sir JAMES PURVES-STEWART remarked that the prognosis depended largely upon the stage at which the physician recognised the disease.

Dr. CALDWELL, in reply, said that if a patient proved resistant to infection with the benign tertian parasite it was often possible to inoculate him with the quartan variety. He had treated a pregnant woman with malaria without ill-effects.

Exophthalmos of Central Origin.

Dr. W. RUSSELL BRAIN read a paper on exophthalmos associated with organic disease of the central nervous system. Exophthalmos might, he said, occur in conjunction with paralysis of ocular movement either of the supranuclear or of the nuclear type. The conjugate ocular palsies found were usually in the vertical plane. Internal ophthalmoplegia occurred less frequently. Either retraction or ptosis of the upper lids might be present. Hyperglycæmia and glycosuria were common in these cases, and the thyroid might or might not be enlarged. The pathological nature of the causative lesion was often obscure. Encephalitis lethargica was responsible for some cases, and in another group the blood pressure was raised. Those patients in whom exophthalmos was associated with ophthalmoplegia and thyroid enlargement were of great interest, though ætiologically obscure. Exophthalmic goitre and myasthenia gravis had been described as occurring in the same patient. He showed lantern slides of ten of the cases described, and concluded that it seemed impossible to draw a hard-and-fast line between exophthalmic goitre and certain cases of organic lesions of the mid-brain.

Sir J. PURVES-STEWART inquired whether there was any evidence of disease of the pituitary gland or of the cavernous sinus in the cases reported.

Dr. DOUGLAS MCALPINE pointed out that enlargement of the thymus was common to both exophthalmic goitre and myasthenia gravis.

Dr. RUSSELL BRAIN, in reply, said that pituitary disease had been excluded in his patients, and that the ocular palsies were not characteristic of cavernous sinus disease. He hoped that further investigation of these obscure cases might throw light upon both exophthalmic goitre and myasthenia gravis.

Psychic Pain and the Psychoses.

Dr. H. DEVINE considered that psychic stress was not an important factor in the causation of the psychoses. If in a given case it appeared to be so there was usually a history of pre-existing mental abnormality. After discussing the biological significance of pain, Dr. Devine said that it seemed to be part of the scheme of things that life should have to struggle in a hostile environment. The difficulties of life could not be diminished by improving external conditions, and if in fact external factors were an important cause of psychical illness little could be done to prevent it. Schizophrenic patients renounced

the pain and struggle of life and passed into a state which, as Jung had pointed out, resembled normal dreaming. They showed a deterioration not of the most recent but of the most primitive instinctive and emotional tendencies. Dr. Devine concluded that a vigorous intellect was not nearly as important a part of the equipment for life as a stout heart.

Dr. CRICHTON-MILLER said that the problem before civilisation was not so much to maintain *mens sana in corpore sano* as to render the individual capable of meeting intellectual and spiritual demands which conflicted with the more primitive biological values.

Dr. H COHEN (Liverpool) showed a film illustrating the technique of air replacement in the radiological diagnosis of cerebral lesions, and discussed the diagnostic value of ventriculography and encephalography.

Sir J. PURVES-STEWART also showed an interesting series of slides illustrating the results of encephalography in intracranial tumour and other conditions.

SECTION OF OPHTHALMOLOGY.

Ocular Palsies.

AT a meeting of this section, with Dr. E. E. MADDOX in the chair, Dr. GORDON HOLMES said that few questions in neurology and ophthalmology were more difficult than the adequate analysis of an ocular palsy. Palsies might be due to lesions involving upper or lower motor neurones. A lesion of the lower motor neurone affected the muscles as such. A lesion of the upper motor neurone affected conjugate movements. The fibres of the dorsal longitudinal fasciculus connected the third, fourth, and sixth nerve nuclei. It was doubtful whether there are intercalary cells in the dorsal longitudinal fasciculus. Dr. Holmes divided palsies into three groups: (1) Paralysis of the ocular muscle due to disease of motor nerves or nuclei; (2) palsies of conjugate movements; (3) supranuclear ocular palsy.

1. Paralysis of ocular muscles due to disease of motor nerves or nuclei. Nuclear lesions were local, from hæmorrhage, tumour, or most commonly inflammatory, as in encephalitis. Wernicke's superior hæmorrhagic polio-encephalitis, often due to alcoholism, was of particular interest. Ptosis was its most common early symptom. In contrast to this acute lesion was a chronic nuclear ophthalmoplegia causing ptosis in middle life, and progressing to involve other muscles. Brain stem palsies of the intramedullary portion of the nerves were apt to involve the pyramidal tract before decussation, thus causing hemiplegia on the opposite side to the eye lesion. The ocular palsies of disseminated sclerosis were stem palsies. The paralyses of tabes might be nuclear, but were more often root palsies. The latter responded better to treatment. Compression of vessels by arterio-sclerotic vessels at the base of the brain might also occur. Any of the three ocular motor nerves might be so compressed. Rest and iodides usually cured the condition.

2. Palsies of conjugate movements did not usually cause diplopia. Lesions producing limitation of conjugate movements to one side usually lay near the sixth nucleus on that side. Dr. Holmes thought that the centre for depression and elevation of the eyes probably lay in the mid-brain.

3. Supranuclear ocular palsy usually showed inability voluntarily to move the eyes in some direction. When voluntary movements were lost in such cases the eyes might still be able to follow a finger reflexly.

Mr. GAYER MORGAN said he was particularly interested in a group of cases superficially resembling tabes, but with a negative Wassermann reaction. Mr. Foster Moore had described non-luetic Argyll Robertson pupils in 1924. In Mr. Morgan's cases the tendon-jerks remained permanently inactive; the internal ocular paralysis of accommodation and light reaction might recover. These cases were sometimes of sudden onset. Dr. W. J. Adie had pointed out that the true Argyll Robertson pupil contracted briskly on convergence. In these cases the reaction to accommodation was slow and sluggish and typical of a benign condition.

Dr. HOLMES in reply said most ocular movements were reflex, not mainly voluntary. He had seen a case similar to that of Mr. Maddox in which a supranuclear palsy prevented a patient looking to one side without looking down first. He thought syphilitic cases best treated by mercury and bismuth. He emphasised the preliminary fixed staring of the eyes before an oculogyral crisis. The eyes might deviate in any direction. He placed the site of lesion as probably in the corpus striatum.

Eye Symptoms in Encephalitis Lethargica.

Mr. T. H. WHITTINGTON, reading a paper on the Eye Symptoms and Sequelæ of Encephalitis Lethargica in 174 children, said the ophthalmologist found much interest in these cases. In the acute stage there were two common types: (1) "Influenza" with diplopia; (2) ocular palsies in a severe febrile illness. These acute cases often lost their ocular palsies before passing into the chronic form of encephalitis. In the chronic stage only 6 per cent. of the 174 cases had ptosis. Concomitant external strabismus was found in 15 per cent. The reaction to accommodation was affected in 47 cases, and light reaction affected in 23. Oculogyric crises occurred in six cases. These last were associated with parkinsonism. The eyes might roll up and the mouth become fixed open during a crisis, and crises might come as long as eight years after the acute illness; they were associated with emotional disturbance. Mr. Whittington suggested that these crises and symptoms might be release phenomena. The upward rollings of the eyes recalled the rolling up of the eyes in sleep and during gastro-intestinal upsets in infancy. Mr. Whittington pointed out that when hyoscine and stramonium were used in treating these cases the pupils became dilated and accommodation was paralysed. The effects could be counteracted by judicious use of pilocarpine and glasses.

Mr. D. V. GIRI described a case of oculogyral crisis, and Mr. N. BISHOP HARMAN mentioned the occurrence of ocular palsies when spinal anæsthesia was first brought into use.

Mr. WHITTINGTON in reply to a question said that he found no case of paralytic squint in his series. The only complaints of diplopia were during attempts at reading.

Shahan's Thermophore.

Dr. W. H. CRISP, of Denver, Colorado, in a paper on Shahan's Thermophore in the Treatment of Corneal Ulcers and other Eye Conditions, said that this apparatus was an efficient method of applying graduated heat to the eye. The heat was generated in an electrical resistance and conducted to the eye by a nickel-plated brass applicator. Serpiginous ulcers of the cornea responded well to treatment by the thermophore. Perfect anæsthesia by cocaine (5 per cent.), supplemented often by subconjunctival injection, was essential. The eye must be kept immobile during the application. Applications were graduated both in time and temperature. The

machine could be used to provide sufficient heat to remove epibulbar growths. It was useful for troublesome small marginal chalazia.

Mr. W. CLARK SOUTER showed a series of orbital cases by lantern slides. He emphasised the frequency of orbital inflammations secondary to ethmoidal disease. He also laid stress on the importance in diagnosis of assessing accurately the secondary deviation of the eye.

SECTION OF HYDROLOGY AND CLIMATOLOGY.

THE Chairman, Dr. FORTESCUE FOX, in opening the section, said that the first part of medical hydrology, which had to do with medicinal springs, had a traditional practice in England as old as our history. The second part, which related to simple water, had opened a new chapter by the establishment of bath clinics in the towns. The third part of hydrology had to do with the sea, the greatest of mineral waters, in which terrestrial life originated. In the medical uses of the sea the British Islands, with their 6000 miles of coast, were deeply concerned. Those who practised hydrology must understand the good and bad effects of climate in the development of chronic diseases, because the operation of baths was powerfully affected by weather and climate. He believed that a whole new science of medical hydrology and climatology was being built up and that many medical men would in time devote themselves to these branches of practice. It was fitting to inaugurate this section at Eastbourne, with its typical south-eastern climate and excellent nucleus of medical baths; a town which was occupied, as the Prince of Wales had reminded them, in the national industry of turning out healthy boys and girls.

In that day's discussion on the care of

Delicate Children at the Coast

they had, he said, the advantage of the presence of a European authority from the premier (non-tuberculous) marine hospital at Wyk-auf-Föhr, where thousands of children from the German cities were given preventive and curative treatment for the various forms of delicacy which were the precursors of disease.

Dr. CARL HÄBERLIN, after referring to the earlier advocates of sea treatment, Russell and Lettsom in England and Lichtenberg and Beneke in Germany, discussed the treatment of the chronic and relapsing respiratory catarrhs from which the greater number of children sent to the sea suffer. Most of his observations were made on children sent from Hamburg. The hypersensitiveness of these children to colds and infections, he said, gradually diminishes by the sea, and in time smaller adenoid growths decrease so far as no longer to hinder breathing. Many operations on tonsils and adenoids, especially in children under six, may thus be avoided. The good results obtained in asthma Häberlin ascribes to cessation of irritation of the respiratory mucosa by dust and of the skin by over-heating, and to improvement in respiration. The continuous sea breeze stimulates even the clothed skin, and improves its function. He showed graphic records of the reactions of children under treatment. For example, the reaction to cold was investigated by small applications of ice in a number of town children newly arrived. At first the latent stage was long and the reactive redness faint. After some weeks at the sea the latent time diminished and the reactive redness increased. Another test was made by means of rectal and skin temperatures before and after cold baths. The "bad reactions," a considerable fall of temperature with slow and incomplete rise, diminished at the sea in from 50 to 28 per cent. of cases. The reaction to intracutaneous injections of tuberculin began and subsided more rapidly after treatment.

The fundamental and most characteristic effect of sea cure is not, Dr. Häberlin said, its influence on particular parts, but on the whole body. The umstimmung (toning or tuning-up of the whole body) is not a method of treatment of sick organs through direct influence on the seat of disease, but an alteration or modification of the whole body. As evidence of the stimulus to metabolism following exposure to the sea climate, he stated that in 116 children examined in conjunction with F. Müller, the heat production amounted to 2700 calories per diem on a small island, as compared with 1445 calories in a large town. It is notable that the metabolic changes and associated increase in muscular strength occur particularly during rest in the sun and air bath. The prompt improvement in appetite which occurs in 95 per cent. of children is not merely psychological (effect of change), but is due to increased metabolism and heat production, from continual stimulation of the skin. The abdominal circulation improves, chronic constipation is relieved, and the motor, secretory, and absorptive powers of the intestinal tract are increased. The increased activity of the peripheral circulation at the sea is a cardinal fact, and Fox and others have pointed out the significance of defective circulation in the skin in rheumatic cases. Children with nervous irritability are over-excited by new impressions and stimuli at the seaside; rest and limitation of time on the beach are therefore at first essential. At the Wyk Hospital much attention is given to the condition and functions of the skin. The relaxed skin is rendered tonic and active by dry rubbing, washing with cold sea water, air- and sun-baths, or by warm sea-baths, followed by cold shower-baths or sea-baths. Such applications are very brief and guarded; prolonged over-frequent sea- and sun-baths and endless paddling are deprecated as amounting almost to brutalities. As four weeks are in many cases necessary for acclimatisation, the visit to the sea should be of at least three months' duration. For more serious cases of catarrh, asthma, debility, and imperfect development, the stay should be prolonged to 6 or 12 months, or even longer. Treatment of most of the respiratory catarrhs by the sea is more important in winter than in summer.

Dr. PERCY LEWIS (Folkestone) enumerated the characteristics of the seaside climates; abundance of light, pure warm moist atmosphere, equable temperature with small variations, the presence of sea-salt in the air, and a dense atmosphere with frequent small variations of pressure. All the special features of seaside places stimulated metabolism. The abuse of marine climates—too sudden change of habits, too long exposure to sun and air, too much food, and too much excitement—were well understood at seaside schools. Delicate children at first improved during the term and relapsed in the holidays, and only after about a year returned to school without loss of weight at home. The strong stimulation of sea-bathing should only be used after acclimatisation, say one month, then only for short periods, twice or thrice a week.

Sir HENRY GAUVAIN (Alton and Hayling Island) compared the effect of open-air treatment at an

inland hospital and by the sea. Children who react to this powerful stimulus do well, but for those who are not robust enough to respond, there is considerable risk. Leonard Hill and Argyll Campbell had found that the basal metabolism of children during sea-bathing was sometimes increased tenfold—a demand which strong children could meet, but the weakly required gradual acclimatisation. The following régime was adopted with success at Hayling Island hospital: (1) The children started with paddling only, the rest of the body being exposed to sun and air; (2) the body was sprayed with sea-water; (3) the children were immersed in the sea. After immersion they were given a hot drink while standing in a trough of warm water with towels round their shoulders, and then rested round a brazier. Differentiating the types which did well by the sea, Sir Henry stated that the freckling type did not respond well at the seaside. In general, he considered that for healthy individuals the stimulus of a seaside holiday produced better results in August, when the stimulating effect of the spring was wearing off, than when taken earlier in the year.

Dr. W. S. C. COPEMAN (London) summarised the reports received from medical officers of health and seaside practitioners on the coast in the five climatic regions: south, south-west, north-west, east, and south-east. The questionaire dealt with: (1) Particular indications in summer and winter; (2) malnutrition; (3) catarrhal conditions, indigestion, adenoids; (4) rheumatic and cardiac cases; (5) nervous instability, asthma, children from the tropics; (6) physical methods of treatment, the regulation of bathing.

Dr. H. M. RAVEN (Broadstairs) presented a joint medical report from the Isle of Thanet. Children with anæmia, debility, post-nasal catarrh, and chronic empyema did well all the year round, but improvement was most marked in summer. (From December to March certain cases, such as cardiac weakness, poor circulation, and rheumatism, should be treated with caution.) The available medical records from preparatory schools showed high average weight and growth. "Common colds" were not common in local open-air institutions; bronchial catarrhs cleared quickly in summer, but might persist for some weeks with little or no sputum in winter. Tonsils and adenoids were not much reduced except in minor cases. Rheumatic fever was uncommon, and the reporters state that convalescent children appeared to do better in Thanet than at some inland places. In the absence of throat infection, and if cases of minor pyrexia were isolated, acute recurrence was rare. Sea-bathing was not allowed for rheumatic cases. Sun- and air-baths are much used in open-air schools and convalescent homes, and children improve very much faster when the weather permits of this treatment, also moderate sea-bathing, excepting children with poor circulation. It is estimated that the number of bathers at Margate is 1,000,000 annually, at Broadstairs and St. Peter's 50,000.

Dr. K. R. C. HALLOWES (Torquay) referred to the unexplained fact that anæmic children whose homes were by the sea improved when sent inland, just as inland children improved when sent to the sea. It would be interesting to know how far inland the iodine content of the sea air prevailed.

A RESOLUTION.

On the motion of the CHAIRMAN, seconded by Dr. PERCY LEWIS, a resolution was passed recommending that "in view of the increasing use of the climatic advantages and bathing facilities of the British marine resorts and of their great therapeutic value, both for children and adults, in the prevention and cure of disease, a medical organisation be formed to promote the scientific development of these forms of treatment in the British Islands."

REVIEWS AND NOTICES OF BOOKS

Injuries and Sport.

A General Guide for the Practitioner. By C. B. HEALD, M.D., M.R.C.P., Physician with charge of Electrotherapeutic Department, Royal Free Hospital. London: Humphrey Milford, Oxford University Press. 1931. Pp. 543. 25*s*.

THE title of this book is unfair to its scope. Bodily injuries are not, in this country at least, primarily associated with sport, and it may be doubted whether the injuries sustained as a result of sports differ in any essential way from other injuries. The book is not designed only for those whose duties are especially connected with the playing-fields or race-tracks, but will be read with interest by all practitioners. The early chapters contain the chief material upon which the book's claim to originality is based—the analysis of the processes of repair and the advocacy of electrotherapy. Dr. Heald believes repair to be effected by primitive, that is, undifferentiated, cells exuding from the blood, which later acquire the power of becoming differentiated into adult cells, just as the primitive cells of the ovum become differentiated in the process of embryonic growth, under the influence especially of their environment. The author's enthusiasm for electrotherapy is evidently based on a considerable experience. He describes and illustrates the more orthodox methods of treatment by splinting and immobilisation, but lays great stress on the value of anodal galvanism in relieving pain and in diminishing swelling due to effusion and muscular spasm. The general practitioner, to whom the work is addressed, is not at present in a position to be a dispassionate judge of electrical methods, but he is generally eager to try out new measures which are said to be beneficial in cases of injury. The short chapter on massage (physiotherapeutics) reflects a more general verdict. Neither in this section nor in that on electrotherapeutics is there any reference to the possible exclusion of children from these methods of treatment.

The book appears to be a very complete, though necessarily condensed, account of injuries and their treatment. The second and more extended part deals with specific injuries of bony and soft tissues in different parts of the body, and is summarised in a long appendix, which can be used as an emergency reference-table in diagnosis and treatment. The book has 380 illustrations, and on the fly-leaves will be found a diagrammatic index for both bony and soft-tissue injuries.

The study of this work will undoubtedly enlarge both the general outlook and practical efficiency of the practitioner in regard to injuries which sometimes cause him more worry than any other group of cases; the possibility of unusual complications, easily over-

looked during attention to other surgical detail, is not ignored by Dr. Heald. After the practitioner has dealt with an emergency he will do well to ascertain from this book, with the help of the curious but useful index, in what ways he may be able to protect his patient from future disability.

Diagnosis and Treatment of Venereal Diseases in General Practice.

Fourth edition. By L. W. HARRISON, D.S.O., F.R.C.P.E., Director of Venereal Diseases Department, St. Thomas's Hospital. London: Humphrey Milford, Oxford University Press. 1931. Pp. 567. 25*s*.

THERE is sufficient new information in this book to make it worth buying even by those who have the third edition. The section on treatment of syphilis has been almost wholly rewritten, and care has been taken to emphasise indications for and against special preparations and their dosages at different stages of the disease. Every possible complication of arsenobenzol therapy is dealt with and the Abelin test of the brothers Lloyd is described, as a guide to the prevention of dermatitis and jaundice during 914 administration. The latest theory of E. B. Craven, Jr. (Johns Hopkins Bulletin, 1931), is added on a special slip facing page 378, stating the type of diet considered most likely to prevent jaundice during treatment. Full details of treatment for each stage of syphilis are given, and Colonel Harrison emphasises especially the danger of under-treatment. The one section in which more detailed instruction might be acceptable to the practitioner is that on treatment of the pregnant woman. The section on gonorrhœa and its treatment is sound both from the surgical and the psychological points of view. All usual complications of the disease are described and appropriate treatment is recommended. Vaccine therapy is fully discussed; in Colonel Harrison's view the recently produced vaccine of L. Dimond has so far proved by far the most valuable on the market. Non-venereal lesions which are liable to be mistaken for venereal conditions are described and illustrated by excellent plates. Dr. F. G. Crookshank has contributed an account, extending over 50 pages, of the medico-legal aspects of venereal disease, and admirable appendices give, in brief, descriptions of the Wassermann tests and of the various flocculation tests in common use; Lange's gold test is also described. The illustrations are good, some of the colour prints being particularly helpful.

Colonel Harrison's book should be of value not only to the general practitioner but also to the physician who sees in his wards the later visceral and nervous manifestations of syphilis, and whose knowledge of modern medication and dosage sometimes lags behind his clinical and diagnostic ability.

Farmacologia de la Digital.

By A. GAMIR. Madrid: Editorial Paracelso. 1931. Pp. 308. 7 pesetas.

THIS book is intended to provide Spanish pharmacists and doctors with a comprehensive survey of the main facts concerning digitalis purpurea. The author begins with a historical account of the plant from its first description by botanists up to the most recent attempts to elucidate its chemistry, and goes on to describe the botanical characters of digitalis, the various methods of cultivation, collection, preservation, and preparation of the leaves, and the means of identifying the pure drug and of recognising adulterations. A chapter is devoted to a discussion of its many official, non-official, and patented preparations, and a clear account is given of the chemical composition of its active principles. Of special interest to the medical man are the chapters devoted to an analysis of the action and uses of the drug, the methods of assaying its active principles, and the dosage when given by various routes. The book ends with an account of the toxicology of digitalis, and gives a number of reactions by which its presence can be recognised. It is a well-compiled and useful monograph.

The Doctor's Second Thoughts.

By Sir JAMES CRICHTON-BROWNE. London: Ernest Benn, Ltd. 1931. Pp. 294. 7*s*. 6*d*.

Sir James Crichton-Browne's successful book, "What the Doctor Thought," has here a sequel equally readable. In his long and distinguished career as a physician and mental specialist, Sir James has met many notable people, had many curious experiences, and maintained a keen interest in the scientific and literary aspects of the passing show. This collection of his notes made at the end of his day's work is, as was its predecessor, chatty and informative.

Unorthodox Reminiscences.

By Sir GEORGE TURNER, K.B.E., C.B., F.R.C.S. London: John Murray. 1931. Pp. 344. 15*s*.

Sir George Turner's autobiographical record is not one which would be anticipated from the consulting surgeon of a teaching hospital, and of this the reader will be warned by the title. The author makes little reference to surgery, as an art or science, save where allusions are pertinent to the running commentary of a man of the world upon the happenings of a life which professionally was medical and socially cosmopolitan. A description of a public school in the seventies brings vividly to mind the changes which 60 years have brought about in education—bringing-up, that is, and not tuition particularly—at those essentially national institutions; and some of what Sir George has to say of Uppingham will surprise his audience. But in essentials these examples of autocratic rule remain the same, and it is probable that if Sir George (like Mr. Bultitude) returned to his old school he would to-day incur the same credit and the same penalties for his independence as befell him more than 50 years ago.

A life-long connexion with St. George's Hospital, as student, teacher, and staff-officer, yields good material for reminiscence. The institution is dealt with according to the desultory scheme of the book. Very little is said of hospital administration, or the routine of education in lecture-room or ward; but there are neat portraits, kind and caustic, of various members of the staff; considerable tribute is paid to old hospital servants, and some of the stories illustrate aptly byegone times.

A large number of persons, distinguished in general society or in scientific circles, pass through these discursive pages as friends, travelling companions, and acquaintances of the author, and one chapter contains a sketch of G. J. Romanes of particular interest. Chapters dealing with queer coincidences, odd legal cases, and theatrical celebrities, and other chapters entitled, disarmingly, "A mixed bag" and "Pot-pourri," will repay reading for their anecdotes.

Sir George's love of racing was acquired in his cradle and found its practical expression while he was still at Uppingham. He is the reverse of ashamed of his successes at the ring-side, and it is easy to see that for him the pageant of the race-course and the heterogeneous attendance were the real attractions.

During the war Sir George Turner served with the Navy, with the rank of rear-admiral, and his connexion with the Service leads him to comment on the absence of surgical specialism directed to the needs of the blue-jacket. He outlines a scheme for the appointment of junior specialists from the large general hospitals as Aides to the Naval Medical Service. He would pay these surgeons a small retaining fee, and they could be summoned for special operations from the big towns nearest to the naval hospital where their intervention was needed. Sir George points to the fact that healthy young sailors do not form a large clinical field for special surgery, and that specialists deserving the title are the product of practice in crowded centres.

The book contains reflections upon many circumstances and situations where opinions are divided. Sir George Turner makes no concealment of his views, and would be surprised to find them acceptable to all. Indeed, it is easy to see that he enjoys to face opposition, a quality that gives entertainment to his unorthodox memories.

Journal of Pathology and Bacteriology.

THE following appear in the issue for July, 1931 (vol. xxxiv., No. 4, pp. 401–596).—A simple, delicate, and rapid method of detecting the formation of acetylmeythylcarbinol by bacteria fermenting carbohydrate, by R. A. Q. O'Meara (Dublin). An improved technique for the Voges-Proskauer reaction, using a simple culture fluid with sodium fumarate and testing with creatine and caustic soda.—Auto-hæmagglutination, by W. Boxwell and J. W. Bigger (Dublin). A clear and convincing example of this rare condition, in which the patient's serum agglutinated her own or any other human red corpuscles at room temperature.—Acetaldehyde as a fixative for neuroglia, by J. Gough (Cardiff). Followed by silver impregnation.—Mitochondrial changes in experimental oxalate and manium nephritis, by J. Gough (Cardiff). Mitochondrial changes are perceptible after an hour or two, and do not necessarily indicate irreparable damage.—The classification of Monilias by serological methods, by K. Stone and L. P. Garrod (London). By complement-fixation and precipitation tests all cultures obtained from cases of thrush were identical, and the majority of those derived from various pathological lesions belonged to the same group.—Compression fracture of the fourth lumbar vertebra of a calf, by T. Hare (London).—The action of Congo red on streptococcal hæmolysin and on *B. welchii* hæmolysin, by J. Gordon (Leeds). Congo red neutralises these hæmolysins, and the action is reversible; it does not neutralise saponin or bile salts.—Malignant phæochromocytoma of the adrenals, by E. S. J. King (Melbourne). Bilateral solid tumours of the adrenal medulla with secondaries in liver, lungs, bowels, bones, &c.; the cells relatively well differentiated, and many giving the chrome reaction.—An epizoötic produced by a hæmolytic streptococcus in laboratory guinea-pigs with abscess formation, by W. W. Beattie (Montreal). Acute and chronic lesions caused by an organism indistinguishable from *S. pyogenes*.—Further observations on testicular extract and its effect upon tissue permeability, by D. McClean (London). The author has failed to identify or isolate the substance in extracts of testis, which has such a remarkable effect on the dispersion of particulate emulsions injected into the skin and on the taking of vaccinia virus.—The interactions of staphylococcus toxin anatoxin and antitoxin, by F. M. Burnet (Melbourne). A thorough and scholarly study of staphylococcus toxin, the modification produced by treatment with formalin, and the neutralising antitoxin, which seems likely to be of practical value.—Lesions of the adrenal glands of rabbits caused by infection with herpes virus, by W. Smith (London). Some strains of virus produced a generalised infection after inoculation into the skin.—A new series of graded collodion membranes suitable for general bacteriological use, especially in filtrable virus studies, by W. J. Elford (London). Technical details of a complex procedure.—A strain of *Bact. ærtrycke*, with unusual epidemic characters, by W. W. C. Topley, M. Greenwood, and J. Wilson (London). Produces a widespread infection of a mouse population without causing a severe and fatal epidemic, and so results in a considerable degree of protection.—A new serological type of Salmonella, by P. H. Leslie and A. G. Shera (Oxford and Eastbourne). Isolated from a clinical example of paratyphoid fever.—The preparation of fractions of different antitoxic quality from the same serum, by M. Barr and A. T. Glenny (Beckenham). Successive fractionation with ammonium sulphate gives a series of antitoxic globulins with widely different in vitro/in vivo ratios.—Enzoötic hepatitis or Rift Valley Fever: an undescribed virus disease of sheep, cattle, and man from East Africa, by R. Daubney, J. R. Hudson, and P. C. Garnham (Kenya).—The chemotherapy of experimental streptococcus infections, by C. H. Browning, J. B. Cohen, S. Ellingworth, and R. Gulbrausen (Glasgow and Leeds). Some anil quinolines have a decided effect in preventing and curing streptococcal infections in mice.—Staphylococcus toxin and antitoxin, by H. J. Parish and W. Clark (Beckenham). The reality of the toxin and the efficacy of the antitoxin are confirmed.—Further notes on Paget's disease of the nipple, by R. Muir (Glasgow). The condition is caused by the invasion of the epidermis by a carcinoma arising in the ducts or alveoli of the heart.—A new method of applying Nile blue as a fat stain, by T. Rettie (Edinburgh).—Obituary notices of C. Powell White (portrait) and John Anderson. Proceedings of the Society.

IN the issue of September, 1931 (vol. xxxiv., No. 5, pp. 597–700) W. Bulloch (London) gives a very interesting account, with a striking portrait of Shibasaburo, Baron Kitasato, the first Japanese bacteriologist, his devotion to Koch, his discovery with Behring of antitoxin, his identification of the plague bacillus, and his influence for good in his country.—Experimental renal disease produced by X ray, by M. S. S. Earlam and A. Bolliger (Sydney). Unilateral renal lesions produced by single exposures to X rays of medium wave-length consist of acute degeneration of the convoluted tubules; this is followed by scarring and some regeneration. X ray nephritis when well established is characterised by nitrogen retention, hypercholesterolæmia, polyuria, uræmia, and œdemia. A thorough anatomical and functional study which should be read in detail.—Primary cancer of the thymus with pluriglandular disturbance, by O. Leyton, H. M. Turnbull, and A. B. Bratton (London). A boy of 11 became fat and hairy; a man of 31 showed increasing fatness of the face, neck, and trunk. Both had diabetes mellitus, and at necropsy showed a small-celled medullary carcinoma of thymus with hypertrophy of the suprarenal cortex, functional hypertrophy of the thyroid, and fatty livers.—A further contribution to the knowledge of innervation of human tumours, by H. Oerte, H. Nye, and B. Thomlinson (Montreal). Affirms their previous conclusion that tumours really have nerves of their own (see p. 646).—On the existence of two forms of diphtheria bacillus—*B. diphtheriæ gravis* and *B. diphtheriæ mitis*—and a new medium for their differentiation and for the bacteriological diagnosis of diphtheria, by J. S. Anderson, F. C. Happold, J. W. McLeod, and J. G. Thomson (Leeds).—Obituary notices of J. Lorraine Smith (portrait), G. McCallum, and A. T. MacConkey (portrait).

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THE LANCET.

LONDON: SATURDAY, SEPTEMBER 19, 1931.

STRAITENED HOUSEKEEPING.

THE axe has fallen on medicine, in the first instance on the obedient necks of the 15,750 doctors in insurance practice who forgo on the average just under £50 each. On behalf of this group of practitioners the deputy medical secretary of the British Medical Association has intimated to Government health departments that they are prepared to bear their fair share of the burden which the community generally will be called upon to shoulder. This implies the acceptance of the reduction of the capitation rate by one shilling, as recommended by the May Committee, but not of the grounds on which this committee justified the reduction. The MINISTER OF HEALTH has stated in effect that the proposal for a percentage reduction is not based upon any doubt whether the present capitation fee is a just payment for services rendered; the grounds upon which it was based in 1924 remain unchallenged, and it is open to the Insurance Acts Committee to suggest its reconsideration at any time considered expedient. Rural practitioners will of course suffer more than urban ones from the increased duty on motor spirit, but they will not be subjected to reduction in the mileage grant. Representatives of the I.A.C. were assured that there would be corresponding sacrifice on the part of other bodies or persons concerned in the administration of national health insurance. Salaries in the public health services are not directly affected by this decision, but the MINISTER OF HEALTH in his circular dated Sept. 21st has intimated to local sanitary authorities that they should give all their officers the opportunity of sharing equitably in the sacrifice demanded by the national need, a euphemism which these authorities will not be slow to translate. They have it is true for the most part entered into binding agreement that certain scales of medical salaries would be maintained for five years from 1929, and if the present medical staffs do not ask to be regarded as a privileged group of local government officials, they are at all events entitled to expect uniform treatment over the whole country.

The public health doctor is likely to forget his personal sacrifice in his fear that social services may be imperilled through the cutting down of other expenditure by local authorities. He will be relieved that the circular, to which allusion has been made above, contains a sharply worded warning against any wholesale and ill-considered course of cutting down expenditure whatever its nature or purpose may be, though it enjoins the utmost care in making charges on the local rates, since the ratepayer and taxpayer are largely the same people. In making a survey of its expenditure the local authority is asked to pay special regard to whether the service is required on urgent grounds of public health. No one will quarrel with wise economy in administration and the strict supervision of every detail of expenditure, for as one of our correspondents remarks (p. 649), it is possible for big public departments to be grossly extravagant in small items, the cumulative effect of which is considerable. Some of our medical officers may positively enjoy the task of achieving efficiency in public health measures, for there are still many obsolete practices in high places, excused on the ground that public faith may not survive the scrapping of measures formerly enjoined. It may indeed be long since water-carts in London sprayed dilute permanganate on the streets, but routine house disinfection is a relic of epidemiological theory which we have long grown out of. It may be something of a fearful joy for the medical officer to be compelled by economy to discard such incubuses. Institutional life is proverbially uneconomical. It can of course never emulate the value which a canny and imaginative housewife with a growing family gets out of a minimal income, but here again there will be positive satisfaction in tightening up slackness. Another of our correspondents indicates some of the places where detailed saving can be effected without loss of efficiency. Many of the feeble old people in our public assistance institutions would get along well enough at home with a little extra assistance and oversight unless removed by the zealous official, and the same applies to many forms of chronic illness for which the constant attention of a skilled staff is not needed. This would release beds for hospital cases which would otherwise have to be provided at a large capital expenditure. In fever hospitals beds are too largely occupied in isolating mild cases of scarlet fever long after medicine has become aware that their isolation is powerless to affect the prevalence of disease in the community. Only a tithe of the money so saved would be required to put into effect the principles of preventive immunisation which are already achieving so much in the more enlightened communities.

We may not hope that the lean years will pass without the call for further sacrifice. Capital expenditure on repairs and renewals, if too long delayed, may assume large proportions and render impossible developments of the health service which showed great promise last year. It may require rigid determination to maintain what has already been achieved. And for this the coöperation of an intelligent public will be invaluable. Instruction in public health must go on, and with better times the full activities can be resumed, probably with better outcome as the reward of hard-won discrimination.

EPIDEMIC RABIES IN MAN.

THE last twenty years have been remarkable for the appearance, either for the first time or in forms of enhanced virulence, of diseases due to

filtrable viruses, and especially those with a predilection for the nervous system. The outbreak and world-wide dissemination of epidemic encephalitis lethargica was followed only a few years later by the occurrence of large numbers of cases of post-vaccinal encephalitis, of encephalitis complicating measles, and of acute disseminated encephalitis of unknown origin. Resemblances were observed between the three last-named forms of encephalitis and the "neuroparalytic accidents" which had for many years been known to complicate the Pasteur treatment of rabies in man. In this issue Dr. E. WESTON HURST and Dr. J. L. PAWAN report an epidemic of acute ascending myelitis which occurred in 1929 in the island of Trinidad, and which there is reason to believe was due to the virus of rabies. Seventeen natives, including members both of the East Indian and of the Negro races, were affected. The clinical picture was that of ascending paralysis, with loss of sphincter control, terminating fatally through paralysis of respiration. The pathological changes in the spinal cord were characteristic of rabies, though no Negri bodies were found. The disease proved transmissible to animals which exhibited both the symptoms of rabies and the characteristic pathological changes of this disease, including the presence of Negri bodies. A similar virus has been isolated from cattle in Trinidad. No direct mode of transmission from the cattle to the affected individuals has been discovered, nor was there evidence that they had been bitten by dogs. It is tentatively suggested that the disease has been conveyed from the cattle to man by the blood-sucking vampire bat, indigenous to Trinidad.

Ascending paralysis without mental excitement and pharyngeal spasm has long been recognised as a rare manifestation of human infection with rabies, and is the characteristic form of the disease in some animals, especially the bovidæ. An epidemic of this form of rabies in man has not previously been described, though R. KOBAYSHI [1] isolated a virus resembling that of rabies from a sufferer in an epidemic of encephalitis in Japan in 1924. There is some doubt, however, as to whether this virus should be held responsible for the epidemic. R. E. KNUTTI [2] has recently reported a case of myelitis in man, which he proved to be due to the virus of rabies, and in which the mode of infection could not be traced. The possibility of rabies infection must therefore always be considered in obscure cases of ascending myelitis or Landry's paralysis, even when there is no history of contact with a rabid animal.

As in the case of acute disseminated encephalitis complicating the exanthemata, controversy has arisen as to whether the "neuroparalytic accidents" which occur in the course of the prophylactic treatment of rabies should be regarded as due to rabies virus, or to some toxin injected with the vaccine, or to a previously latent neurotropic infection. HURST and PAWAN apparently reject the view that rabies is the cause, for they state that the "cases of paralytic rabies arising during or after antirabic treatment must be sharply differentiated from those of the so-called paralytic accidents in which the lesions, quite different from those of rabies, are identical with those in post-vaccinal encephalitis." It is doubtful, however, whether upon clinical grounds cases of acute ascending paralysis occurring during treatment for rabies can be sharply distinguished from acute transverse myelitis arising in similar circumstances. In both cases the period of incubation is shorter than that of rabies itself. Whether the pathological differences justify the assumption of a difference in ætiology may be doubted, especially as in KNUTTI's case both the white and the grey matter of the cord were extensively destroyed. P. BASSOE and R. R. GRINKER,[3] who have lately compared the pathological changes in human rabies with those in rabies vaccine encephalomyelitis, point out that in many ways the rabies vaccine is analogous to vaccinia. They suggest that in both cases the encephalomyelitis which may follow the vaccination owes its peculiar pathological features to the fact that it is caused by an attenuated virus.

[1] Japan Med. World, 1925, v., 145.
[2] Jour. Amer. Med. Assoc., 1929, xciii., 754.
[3] Arch. Neur. and Psychiat., 1930, xxiii., 1183.

IRREGULARITIES OF THE TEETH AND JAW.

ALTHOUGH FAUCHARD, in the eighteenth century, wrote about irregularities of the teeth and devised some simple forms of appliance for their treatment, yet the first contribution of importance to orthodontics was the book on oral deformities written by NORMAN KINGSLEY in 1879. Eight years later, with the publication of E. H. ANGLE'S famous book on "Malocclusion of the Teeth," the science of modern orthodontics was definitely launched, for ANGLE provided it with a classification and a technique which, in a modified form, have remained an integral part of its teaching. Up to now the greatest advances in the subject have been along the lines of technique, for a succession of ingenious mechanical appliances of great delicacy have been devised for the purpose of moving misplaced teeth into correct alignment. Our knowledge of ætiology has been relatively scanty, though a mass of literature has been accumulated on the subject.

The latest contribution [4] is a volume by Prof. J. B. BRASH, amplified from a series of four lectures delivered under the auspices of the Dental Board. Prof. BRASH'S previous work on the growth of the jaws, normal and abnormal, details original research. This volume represents a critical stock-taking of the extent of our knowledge of the causation of malocclusion, and shows discernment, as well as breadth of knowledge. We imagine that it will be long before it is superseded.

Many different theories have been propounded on the cause of irregular teeth; for no one theory could explain all forms of malocclusion, and the types of irregularity are numerous and varied. Certain well-recognised forms of irregularity seemed to have an

[4] The Ætiology of Irregularity and Malocclusion of the Teeth. By Prof. J. B. Brash, M.A., M.D. London: The Dental Board of the United Kingdom. 1931. 5s.

obvious explanation. For example, the crowding of the premolars is attributed to premature loss of the milk molars, the separation of the upper incisors to a persistent frænum or to the presence of a supernumerary tooth, the gap between the upper and lower incisors to thumb-sucking. But these irregularities, though they may lead to impairment of function and facial disfigurement, are of minor importance. The gross forms of malocclusion, in which the whole of the dental arches are involved, are more puzzling. Certain constantly recurring types of malocclusion tend to fall into three groups: (1) generalised crowding, usually affecting both jaws, and characterised by narrow arches, high palate, and prominent incisors; (2) defective development of the mandible, accompanied by a receding chin and a prominence of the upper front teeth, which appears greater than it is because of the retrusion of the lower incisors; and (3) the underhung lower jaw, in which the lower incisors project beyond the upper teeth. These main types of malocclusion, which are serious both æsthetically and functionally, have given rise to much controversy. In the early days of orthodontics, attempts to explain irregularities of the teeth in terms of mechanical factors were common. Even such varieties as superior protrusion and inferior retrusion were attributed to local factors operating in childhood. Gradually it was realised that such explanations were unsound, and that while certain limited and sharply defined types of irregularity might be due to a mechanical factor, some other explanation must be sought for the more serious forms of malocclusion. The next stage in the history of orthodontics was the ascription of malocclusion to exogenous and environmental factors, such as adenoids and mouth-breathing, bottle-feeding, and rickets. For long the association between adenoids and both superior protrusion and mandibular retrusion was accepted by many authorities. Explanation of the genesis of contracted arches was simple and plausible. The pressure of the cheeks in mouth-breathing and the absence of the moulding action of the tongue, which should lie against the palate in nasal respiration, were factors which, according to this view, combined to push up the palate and buckle the nasal septum and so compress the dental arch. Unfortunately, this facile theory was found less acceptable as knowledge increased. M. H. CRYER showed that there was no constant relation between the palate and nasal septum, and that a broad arch could be associated with a deflected septum and vice versa. More recently, Prof. BRASH observed that the level of the palate descends as growth occurs, and that the high palate associated with contracted arches is due to an abnormal growth of the alveolar processes. This observation did much to cast doubt on the validity of the hypothesis that adenoids and mouth-breathing are the most important factors in malocclusion. Prof. BRASH concludes from a review of the evidence that "it has still to be proved that there is any significant correlation between the presence of adenoids and the incidence of deformities of the jaws and palate."

The more recent developments in orthodontic science have been in the direction of exploring the rôle of exogenous factors in malocclusion, such as heredity and disorders of growth. It is significant that whereas 20 years ago attention was chiefly focused on the permanent teeth, and the possibility of malocclusion in the milk dentition was passed over as both rare and unimportant, now the orthodontist devotes an increasing amount of attention to the milk dentition. A closer study has shown that malocclusion is common in this dentition, and therefore that the factors concerned in irregularities of the teeth must commence in early life. More recently attention has been paid to the possibility that deformities of the jaws are established during fœtal life. B. WEINBURGER, M. SCHWARZ, and others have shown that the condition of mandibular retrusion may be present at birth. The study of the inheritance of jaw forms and malocclusion has become imperative, and it seems likely to shed much light on the ætiology of malocclusion. Sir ARTHUR KEITH has established a strong case for the view that evolutionary tendencies of comparatively recent origin are tending to bring about profound changes in the shapes of the jaws and that some forms of malocclusion represent a disharmony in evolution. Prof. BRASH arrives at the conclusion that while there are "accidental" happenings to the jaws such as habits, mechanical factors, or recognisable pathological conditions, the explanation of malocclusion in general must be sought in inheritance, and that environment, though not negligible, is a complemental factor. The narrow attitude which looked upon irregularities of the teeth as a local condition with a local cause is thus being abandoned in favour of the view that the ætiology of malocclusion is part of a large problem which can only be solved on biological lines.

THE BRITISH ASSOCIATION.

As already announced in our columns, the centenary meeting of the British Association for the Advancement of Science will be held in London from Sept. 23rd to 30th. The installation of Lieut.-General J. C. Smuts, F.R.S., as president will take place next Wednesday at 3 P.M. in the Albert Hall, and at 9 P.M. on the same evening, at the Central Hall, Westminster, he will deliver his presidential address on the Scientific World-Picture of To-day. The meeting coincides with the celebrations commemorating the centenary of Michael Faraday, who, on August 29th, 1831, made the discovery of electro-magnetic induction. Delegates will be received at the Royal Institution in the afternoon of Sept. 21st and a meeting will be held in the same evening at Queen's Hall, when addresses on Faraday's work will be given by the Prime Minister, the duc de Broglie, Marchese Marconi, Prof. Elihu Thomson, Prof. P. Zeeman, Prof. P. Debye, Lord Rutherford, Sir William Bragg, and Lord Eustace Percy. On Sept. 23rd, a Faraday exhibition, organised at the Albert Hall by the Institution of Electrical Engineers, will be opened to the public. Special exhibits will demonstrate the full development of electrical and chemical science and industry which have their origin in Faraday's work.

ANNOTATIONS

DIFFICULTIES IN CERTIFYING MENTAL DEFICIENCY.

Part V. of the Education Act makes it the duty of the parent of a defective child to cause the child to attend a special school where one is available. The local education authority, if satisfied that the parent is not making suitable provision for the child's education, may require the parent to send the child to a suitable school. "If he fails without reasonable excuse to do so," the local authority may apply for a magistrate's order. The first question, of course, is whether the child is defective, not merely "dull or backward," to quote Section 55 of the Act, but "by reason of mental or physical defect incapable of receiving proper benefit from the instruction in the ordinary public elementary schools." A recent case, before the Taunton magistrates, failed because the medical witness could not agree upon the question whether the child was defective or not. The child was a girl of 13. The school medical officer for the borough (Dr. J. Allen) gave evidence that she was at least three years below the usual standard for her age. After an adjournment, apparently arranged in order to obtain further medical evidence, Dr. H. T. Aveline, superintendent of the Mental Hospital at Cotford, gave evidence that the girl read and wrote from dictation quite well, could calculate change satisfactorily, and was able to tell the time. He found her decidedly backward and dull in her answers to certain intelligence tests, and he thought her about a year behind her age; but he did not consider her certifiable as a feeble-minded person. He thought her capable of receiving benefit from the instruction in the ordinary public elementary school. Section 55 of the Act seems to require that such a child should be capable not only of receiving "benefit" but of receiving "proper benefit" in an elementary school. However that may be, the magistrates declined to order her to be sent to the Sandhill Park Institution at Bishop's Lydeard and dismissed the local authority's application with costs.

It is unfortunate when such proceedings are brought unsuccessfully. The refusal of such an application tends to encourage parents of other backward children in their very natural reluctance to send a child from home to a special institution. It is particularly unfortunate when the failure of the proceedings is due to diversity of medical evidence. Whether or not the variance was due to the fact that the superintendent of a mental hospital approaches a case from a slightly different angle from that of a school medical officer, it is a pity that medical standards of mental deficiency should be capable of representation as merely personal. Possibly consultation between medical witnesses would save the local authority from taking fruitless action or alternatively would enable the question of the child's deficiency to be referred to the Board of Education as may be done "in case of doubt" under Section 55 subsection (6) of the Act. Children suitable for special school education are usually certified before the age of 13; but there appear to have been special circumstances in the Taunton case, for it was stated that the girl had originally been certified by the county medical officer. Certification for purely educational purposes may some day be abolished if the recommendations of the Wood Report receive effect. The Taunton case will perhaps bring the day nearer.

STIFF JOINTS.

THE need to distinguish clearly between stiffness and true ankylosis before attempting to improve the mobility of a joint, or assessing disability, is emphasised by Dr. Laquerrière, Dr. Loubier, and Dr. Jaudel in a communication to the May-June issue of the *Revue d'Actinologie et de Physiothérapie*.[1] In true ankylosis the articular ends are united by bone or fibrous tissue, and these cases are outside the scope of physiotherapy. In cases of false ankylosis, or joint stiffness, as the authors prefer to call them, X ray examination shows the absence of bony union and the presence of a joint cavity. The stiffness may be due to a variety of causes, which must be investigated, but even after the condition has been correctly diagnosed the degree of improvement which may be expected to follow on a course of physiotherapy cannot be predicted. The authors' experience, that apparently similar conditions show marked differences in their reaction to physical treatment, accords with that of other observers. When the articular ends of the bones have undergone definite changes in shape, the possibility of effecting some improvement in function must be considered; the presence of a bony mass may frustrate any attempt to improve the usefulness of the joint by physiotherapy. In cases of joint stiffness following injury, when X ray examination is negative, thickening of the tissues surrounding the joint may sometimes be recognised on palpation. This thickening is at first due to œdema and congestion of tissues in the early stages of repair, and later to the development of fibrous tissue. In neglected cases, contraction of joint-capsule and ligaments, adhesions of tendons, atrophy of muscles, and, in old-standing cases, decalcification of the bone and atrophic changes in the cartilage, have destroyed the functional capacity of the joint. In their early stages extra-articular lesions respond favourably to physiotherapy; later, prolonged treatment may give some functional improvement. A pseudo-stiffness due to intra- or extra-articular causes of pain on movement must be recognised. It may be due to an inflammatory process or to the presence of loose bodies and fringes. In cases of stiffness due to cicatricial contractions of soft parts, where destruction of the tissues was not too extensive, the authors have recorded satisfactory results from radiotherapy and ionisation. The use of the constant current is recommended in the treatment of stiff joints because of its properties of allaying pain, improving the blood-supply, and diminishing œdema and vascular stasis. These authors claim for it also a trophic action and a mild fibrolytic action, which they attribute to the liberation of sodium ions in the tissues. Ionisation has given good results in their hands; iodine and salicylic ions are most frequently employed. Local ultra-violet irradiations are recommended for the improvement of tissue nutrition, and infra-red radiations as sedatives. Faradic stimulation and diathermy are also recommended.

Many of the cases reported by Dr. Laquerrière and his colleagues were first seen weeks, or even months, after the primary injury to the joint, at a time when the most profitable stage for physical treatment had passed. This neglect is not altogether unknown in this country, but fortunately most practitioners are beginning to realise that it is in the period immediately

[1] Revue d'Actinologie et de Physiothérapie, 1931, vii., 306.

following the injury that the functional value of a joint should be safeguarded by adequate treatment. It is becoming more widely known also that the final disability does not depend entirely on the severity of the initial lesion. A momentary, or even an incomplete, separation of the parts of a joint involving tears in the capsule and ligament, and separation or tearing of the cartilage, is no longer regarded as a trivial injury. Rest, under conditions approaching most closely to the physiological requirements of the tissues, and approximation of the lacerated structures during the early stages of repair are now considered essential for the attainment of good functional results. Splinting, massage, active movements, electrotherapy and irradiation, all play their part in the attempt to establish the ideal conditions for repair. Rest, in the early stages of repair, inhibits the formation of excessive fibrous tissue and lessens the risk of the development of bone in the tissues surrounding the injured joint. Electrotherapy is directed in the early stages towards allaying pain, clearing up œdema, assisting the blood-flow, and warming the tissues. Massage, if it is gentle and superficial, relieves spasm. Subsequent treatment involves the maintenance of favourable local conditions of warmth and good blood-supply, and the encouragement of active movements designed gradually to increase the tone of the muscles, until ultimately full resumption of free voluntary movement is attained.

VITAMIN D IN IRRADIATED YEAST.

IT is now pretty generally recognised that infants and young children, in temperate latitudes throughout the world, need routine antirachitic treatment at any rate in the winter; the incidence of rickets, even among breast-fed babies, is not negligible. In some ways, as A. F. Hess points out, modern science has provided us with an embarrassing richness of therapeutic materials for the purpose and there is also a very wide choice of means of administering vitamin D to the child. Shall we treat the human mother, or the cow from which the artificially fed baby gets its milk, or shall we treat the baby itself, and when we have decided this point, shall we use ultra-violet irradiation or shall we administer cod-liver oil or its unsaponifiable fraction, or irradiated ergosterol, or irradiated milk or irradiated yeast or any other irradiated material? If it is decided to administer the therapy to the human mother or to the cow, rather than to the infant, the fact must not be lost sight of that the mother herself may require the vitamin, and her body may in that case not pass it on to the child. Such therapy through the mother should not be relied on blindly; the milk should be tested biologically in order that one may be quite sure that the desired supplement really reaches the baby. In choosing the means of providing the vitamin to mother or child a number of points have to be considered, beyond the simple one of the antirachitic potency of the means chosen. There are questions of cheapness, of convenience, of palatability, and of possible toxicity; there is also the problem how best to obtain the mother's coöperation, or how to obviate the need of relying on it. The preparation and testing of an antirachitic material which meets most of the important requirements was described in our last issue by Mr. S. K. Kon, Ph.D. who has prepared dried yeast and rendered it potently antirachitic by irradiation with ultra-violet light. Tested on rats this irradiated yeast was found to cure rickets in a very small daily dose, while it retained its antirachitic potency for many months in a refrigerator or exposed to air at room temperature. It was found to be toxic for rats in an enormous dose, 15,000 times the minimal curative dose. A trial of it was made on rachitic infants in Warsaw [1] when a daily dose of 0·75 g. was found sufficient to cure rickets in babies. Hess [2] made trial of the milk of cows fed with a supplement of irradiated yeast; rickets was both prevented and cured in babies who consumed such milk. The above tests seem to show that irradiated yeast can provide a material which satisfies every requirement. It is cheap and convenient; it is not particularly palatable, but the dose needed is so small that the flavour can easily be disguised. If its use as a supplement to the diet of cows supplying nursery milk were made compulsory there would no longer be any question of the mother's coöperation being needed save in the purchasing of the right milk. Irradiated yeast is, however, at one disadvantage; it does not convey vitamin A together with its vitamin D, and every material which fails in this point must be ranked as inferior dietically to cod-liver oil.

IRISH HOSPITALS AND TRAFFIC CASUALTIES.

WHILE many provisions of the Irish Free State's proposed Road Traffic Bill resemble the Road Traffic Act passed at Westminster last year, Clause 156 contains interesting variations as to the reimbursement of hospitals. If the proposal becomes law, a hospital in the Free State will have an independent right of action against a negligent motorist to recover the expense of treatment of a victim. If a patient is received into hospital for treatment of injuries "sustained in such circumstances that the injured person is entitled or (if he has died) was during his lifetime entitled to recover from some other person damages for such injuries," then the person liable to pay such damages "shall also be liable to pay to the governing body of such hospital" damages measured according to the expenses incurred by the hospital in such treatment. The damages recoverable by the hospital are to be measured as follows: they are to consist of a reasonable sum for the treatment, subject to the deduction of any sums paid to the hospital by the patient. If the patient has been maintained in the hospital for treatment, the "reasonable sum" for maintenance is not to exceed the lesser of the two following scales—namely, (1) the rate of 9*s*. a day, or (2) the average daily cost of maintaining a patient in that hospital. The motorist's liability to reimburse the hospital will, it seems, be a risk to be included in the compulsory insurance policy. The cost will therefore fall on the insurance company which will naturally demand a higher premium. This machinery for reimbursing hospitals through the insurance companies has not been adopted in the English enactment, though the Road Traffic Act of 1930 may some day be altered in this respect if the insurance companies decide upon the extra cost of the additional cover, and fix a reasonable increase of premium.

The main point on which lawyers are likely to concentrate is that the proposal enlarges the normal scope of a contract of insurance. A, a motorist, agrees to pay an annual sum to B, an insurance company, in order to obtain protection against third-party risks. But, if the clause becomes law,

[1] Kon, S. K., and Mayzner, M.: THE LANCET, 1931, i., 794.
[2] Hess, A. F., Lewis, J. M., and Thomas, B. H.: Jour. Amer. Med. Assoc., 1931, xcvii., 370.

Y, a hospital, will be entitled to sue A for injuries to Z, the victim of a traffic accident. It may be noted that the new clause will only apply to accidents where the motorist's negligence is established. The hospital, therefore, will not only have the trouble of conducting actions against possibly elusive motorists in whatever may be the Free State equivalents of of our county courts and High Court; it will also have the whole expense of the proceedings if the proof of negligence fails; and it will need to keep in touch with its patients who may be wanted as witnesses months after they are discharged from the wards. The contingency of the patient's death from injuries is provided for; is it clear what happens if the motorist dies? The clause will benefit the hospitals by enabling them to sue where otherwise they have no legal remedy. But there are many traffic accidents where negligence either is not, or cannot easily be proved to be, the cause; allegations of negligence—not to mention allegations of contributory negligence—are often strenuously fought. The hospitals therefore may have bought their new remedy at the price of a string of law suits. Meanwhile, the existence of a system of compulsory contribution to a hospital may disincline both motorist and patient to make any direct and voluntary payment.

NERVES IN TUMOURS.

If the diversity of growths which we classify together as tumours can be said to have any one feature in common it is their functional dissociation from the rest of the body. Anatomically this dissociation has commonly been held to be represented by the absence both of coördinated blood-supply and of nerves. In fact, some tumours have been shown to be surrounded and permeated by a newly formed system of capillary vessels, and even if we look on this development as part of the connective tissue reaction aroused by the tumour, the effect is that the tumour does obtain some of the oxygen which it needs. Something of the same kind may also be true of nerves. Awhile ago Prof. Hurst Oertel, of Montreal, urged that in some cases nerves could be demonstrated in tumours ending in such intimate relation with the parenchyma that their essential nature could hardly be doubted. In the *Journal of Pathology and Bacteriology* for September he returns to the subject with fuller technical details and more ample illustrations, mostly from cancers of breast. It is exceedingly difficult to be sure what the appearances seen and pictured really represent. They certainly look like nerves and nerve-endings, but the silver impregnations by which they have been obtained are liable to behave in curious ways, and it is possible that the findings in tumours are not nerves at all. And again, granting that they are nerves, it may be that they are residua of the tissue invaded by the growth or irritative responses in the neighbouring connective tissue, such as have been amply demonstrated in mouse tumours. On the whole, however, we should be inclined to accept the conclusions to which Prof. Oertel's long inquiry into the subject has led him, and agree that he has demonstrated that some tumours have a nerve-supply to or from the tumour cells themselves. This is by no means the same as saying that all tumours have nerves; nor are Prof. Oertel's findings at any real variance with those of, for example, Dr. Ludford, who has searched for nerves and failed to find them. We gather that Prof. Oertel himself has failed much oftener than he has succeeded. This is, in fact, about what we should expect on general grounds; tumours grade almost imperceptibly from normal tissues to the most bizarre and monstrous formations, and they have no general rules to which there are no exceptions. It would be natural for some of them to have nerves and others none, just as some of them probably have blood-supplies of their own, while others do not. Functionally, tumours of the thyroid, anterior pituitary, suprarenal cortex, parathyroids, and islands of Langerhans may be so related to the body that they produce the obvious effects of excesses of their internal secretions; anatomically, certain tumours may well have some simulacrum of the normal arrangements.

LOSS AND GAIN OF HOOKWORMS.

Hookworm infections are happily of limited duration. Those who have had no chance of reinfection for six or seven years rarely pass the eggs of these parasites, and worms are, for the most part, completely absent after this period. These facts have been known since the early days of hookworm investigations, and observers have been concerned chiefly with the rate of the diminution of infection. Egg counts made on prisoners in India by C. F. Fearnside in 1900, and in Burmah by P. K. Tarapore, in 1913, suggested that the diminution was gradual. This, too, was S. T. Darling's opinion on realising how slowly Tamils in Batavia added ancylostomes to the load of necators which they had brought with them from India; his facts were obtained by counts of worms recovered after anthelmintics, and in his conclusion the belief is implicit that in any country the average worm load is fairly constant, and that gain and loss run parallel. But Darling measured only the balance between gain and loss, which is no necessary measure of the rate of either; while in the investigations on prisoners it was assumed that any opportunity for gain must have been absent or nearly absent.

Assuming a fairly constant average worm load among prisoners admitted to a Calcutta jail, A. C. Chandler [1] satisfied himself by egg counts on the stools of men who had been in prison for varying periods that, following their admission, there was a rapid initial and a later gradual fall in the number of eggs passed; and he claimed that his conclusions were supported by the curves obtained by K. S. Mhaskar,[2] who treated men who had been in a Madras jail for varying periods and counted the worms passed. P. A. Maplestone,[3] however, working in the same jail in which Chandler had worked, obtained quite different results. His method was the more satisfactory, comprising monthly egg counts on the same men throughout a year. His average counts showed no fall in egg numbers as imprisonment lengthened. On the contrary, there was a seasonal variation, with a maximum in May and a minimum in October. He pointed out that some prisoners in this jail were employed in extramural work, so that the occurrence of fresh infections could not be excluded. Maplestone's early and late figures were not, however, strictly comparable, for men were leaving the jail steadily and the fraction which remained throughout, and alone furnished the later figures, may not have had the same original average egg count as that given by the total number with which the investigation began.

[1] The Rate of Loss of Hookworms in the Absence of Reinfections, Indian Jour. Med. Res., 1926, xiii., 625.
[2] Hookworm Infection and Sanitation, Ibid., 1920, viii., 398.
[3] Seasonal Variation in Hookworm Infection, Ibid., Oct., 1930.

G. C. and F. K. Payne [4] have since attacked the problem from another angle. They point out: (1) that, accepting Chandler's curves, an infection of 1000 worms must be accompanied by an average loss of 40 worms a week during the first three months after infection ceases to be acquired, with the bulk of the loss concentrated in the early part of the period; (2) that this considerable loss should be easily detected both by recovery of worms from the stools and by a lessened egg content of the stools. In order to investigate this point they took into hospital two persons whose egg counts showed them to be heavily infected, and observed without treating them for 16 and 19 days respectively. During this period scrupulous personal examination of all stools revealed two worms only in one case, and one only in the other, while in neither was there any discernible lessening of the number of eggs passed. Since, after treatments, these persons voided over 3000 and 1350 worms respectively, and even then were not quite free from infection, the number of worms passed in the pre-treatment period was about 1 per cent. of that required if Chandler's curves held in conditions other than those obtaining at the beginning of imprisonment, with whatever this implies of preliminary anxiety, and subsequent alterations in diet and mode of life. Recent experience is, then, against the conclusion that in ordinary conditions hookworms are rapidly lost after infection. Rather is the older conclusion correct, that the loss is slow and gradual, some parasites persisting for six or seven years. Treatment should not, then, be withheld in the expectation that, by natural loss of worms, the load of infection will rapidly be reduced to a figure which a certain phase of opinion holds to be negligible. The rate of gain of hookworms by any man will, of course, vary with the misfortune, or sanitary misbehaviour, which brings his skin into contact with some heavily infected spot.

RURAL AND URBAN DEATH-RATES IN FRANCE.

In a report communicated by Mr. Marcel Moine, the statistician, to the standing committee of the Office International d'Hygiène Publique, and published in its *Bulletin* for August, some instructive comparisons are made between the death-rates of the country and the town. This study does not include the whole of France, but only certain rural and urban districts, the period under review being the year 1928. It was found that the 114,199 deaths in the urban group were equivalent to a death-rate of 15·3 per 1000, whereas the 42,664 deaths in the rural group were equivalent to a death-rate of 17·8 per 1000. In the same year the death-rate for the whole of France was 16·5 per 1000. Up to the age of 19 the death-rate was considerably higher in the urban than in the rural groups, but between the ages of 20 and 39 the reverse was the case, and in the oldest age-group the death-rate was higher in the rural than in the urban group. Such diseases as those of the heart and kidneys, which do not take a heavy toll of life before the age of 40, were found after this age and for the rest of life to be much more frequent as causes of death in the urban than in the rural group. As for the diseases of the respiratory system other than tuberculosis, the mortality therefrom was definitely higher in the urban group up to the age of 10, and again after the age of 45. Between the ages 25 and 49, the proportion of deaths by violence was higher in the rural group. In the urban group it was the rule for the deaths to be notified by a qualified practitioner, whereas this was the case in only 40 to 76 per cent. of the deaths in the rural areas. There were however two rural areas in which 99 and 90 per cent. respectively of the deaths were notified by a qualified practitioner. It would therefore seem that there should be no insuperable obstacle to this practice becoming general throughout country districts.

[4] Observations on Rate of Loss of *Necator Americanus*, Amer. Jour. Hyg., July, 1931.

OCCUPATIONAL HAZARDS OF CHROMIUM PLATING.

The discovery of chromium plating has brought with it some new occupational risks. These are explained in a recent article by Dr. A. Langelez.[1] He explains that metal objects to be plated are suspended in a bath of chromic acid, and the large volumes of hydrogen released from the cathode carry with them into the air a brownish fog of the atomised liquid. This vapour may damage the skin, the mucous membranes, and the eyes. The skin lesions vary considerably, sometimes taking the form of erythema, sometimes of superficial burning, and in certain predisposed subjects, especially those who perspire freely, of eczematous dermatitis. The fluid is said to have a caustic action on injured skin, producing a hard and painful ulcer, which may penetrate the bone, and has earned in Belgium the name of *rossignol* or *pigeonnau*. These chromium holes, already familiar among chemical workers in chromium compounds, are now encountered among workmen in chromium plating. The ulcers are particularly frequent in the interdigital spaces, the borders of the nails and the knuckles; they progress slowly, and will not heal while the patient is still in contact with the chromium. Treatment is identical with that of burns. The only method of protection hitherto attempted has consisted of long rubber gloves, but even if these remain intact, the continual perspiration is not good for the skin. A dressing is being tried, composed of one part of lanoline to three of paraffin; this is washed off after work, and the affected parts are bathed in a mixture of commercial alcohol one-quarter, hydrochloric acid one-quarter, and water one-half. Some authorities recommend a wash in 2 per cent. sulphate of iron. The results obtained from these applications have not yet been reported; ancillary measures include the use of indiarubber aprons and suitable footgear.

Chromium dust, as encountered in chemical works, is said to form chromium oxide on the cornea between the eyelids; the deposit appears as a brown discoloration, and ultimately impairs the vision. Vapour will not produce this effect, but if the liquid is accidentally splashed into the eye or rubbed in with a finger it may cause burning and ulceration of the cornea, with irreparable damage. This danger may be averted by properly designed goggles. Chromium seems also to have a peculiar affinity for the nasal mucosa, and characteristic lesions occur among those exposed to the vapour. Besides a chronic coryza, a number of workers suffer from an injury of the septum, the site of election being at the level of Jacobson's organ. According to Dr. Langelez, the mucosa atrophies slowly, grows pale and ulcerates, and the cartilage perforates in a few days to a diameter of ½ cm. to 1 cm. In some cases there is considerable phagedæna. This lesion is painless, and does not

[1] Bruxelles-Médical, 1931, xi., 1301.

interfere with nasal function; some workers do not know that they have been attacked until they are medically examined. If the patient leaves work, the injury scars over in a month or two. Manufacturers are now using aspirating apparatus to draw off the noxious vapour, and the workers are being advised to block the nostrils with cotton-wool soaked in paraffin, tincture of myrrh, or silicic acid. The latter precaution, however, makes mouth-breathing inevitable, and facilitates the absorption of the vapour. A respirator would get over the difficulty, but its prolonged use is tiresome, and workers are not easily induced to submit to it. It is possible to protect the nasal mucosa with a film of zinc oxide or balsam of Peru. If chromium plating has come to stay, this new hazard will demand close attention.

UROSELECTAN AS A RENAL EFFICIENCY TEST.

SINCE the introduction of excretion urography methods for the radiography of the kidneys, the possibilities of this technique as a means of estimating renal efficiency have been widely considered. Uroselectan, which was the dye first introduced for outlining the pelvis of the kidney radiographically, contains 42 per cent. by weight of iodine and is thus opaque to the X rays in quite dilute solution. It has a very high specific gravity and is excreted almost entirely in the urine, though there is probably some slight elimination through the liver as well. Given intravenously it is almost completely non-toxic, though it causes some fall in blood pressure and more serious risks in patients with badly diseased livers. A. V. Lichtenberg, who has been in the main responsible for the introduction of excretion urography, did not anticipate that uroselectan would be of service in the investigation of renal function,[1] but it appears that the excretion of uroselectan shows a relatively close relationship to the excretory powers of the kidney in general. The presence of uroselectan in the urine is shown by an increased specific gravity, which may rise to as high as 1060 some three to four hours after the injection, or by its precipitation with acid, or by the iodine reaction with starch solution. With seriously diseased kidneys for instance the dye is so badly excreted that only a poor shadow or no shadow at all can be seen by the X rays. With healthy kidneys the excretion is rapid and complete and, since the dye is non-toxic and passes unchanged from the body, no harm to the kidneys results.

Drs. L. Villa and P. Introzzi[2] have recently proposed a technique for the use of uroselectan as a renal efficiency test in medical diseases of the kidney. Their method is briefly as follows:

A catheter is passed in the morning whilst the patient is fasting, and the bladder emptied; the specific gravity of this specimen of urine is noted. The catheter is left in position and the patient then drinks 300 c.cm. of water; in 15 minutes the urine is drawn off and its specific gravity again recorded. A solution of 10 g. of uroselectan in 30 c.cm. of distilled water is then slowly injected intravenously, some two to three minutes being taken in the procedure. After the injection the urine is collected every two to three minutes for about 20 minutes, and then every 15 minutes for a further period of one hour. The catheter is then withdrawn, but all urine passed until the following morning is saved (for the first six to ten hours in two-hourly portions). Ordinary food may be taken during this time. The volume and specific gravity of the urine in the specimens is noted and the presence or absence of free iodine is ascertained by a simple test, using starch as indicator. In normal cases the iodine reaction first appears in the urine excreted between the second and third minute after the injection and reaches a maximum in that excreted during the next six to eight minutes. Excretion of iodine continues for between four to eight hours. The specific gravity of the urine after the patient has drunk the water falls low and after the uroselectan injection rises from 1001–1003 to 1006–1008 in four minutes, 1015–1016 in seven to eight minutes, and 1020–1022 in 12 to 14 minutes. At this height it remains for some 15 to 30 minutes.

The amount of urine excreted is higher after uroselectan than after simple water drinking without injection of dye. The test therefore estimates particularly the speed of excretion, as well as the degree of excretion of the dye. The authors consider an initial appearance of the iodine reaction later than five to six minutes after the injection of uroselectan as pathological, and a persistently low specific gravity or a delayed rise as having a similar significance. The total duration of the excretion they view as less important. They believe that this test will detect renal function deficiency whilst other tests are still negative; and it has the further advantage that the total time required is only some two to three hours.

Uroselectan shares, with other dye tests, the theoretical disadvantage of being an abnormal substance for the kidney to excrete, and of giving information only as to the capacity of the kidney to eliminate this substance. It is not proved with certainty that this capacity always runs parallel with capacity to excrete other substances. It is, moreover, not yet certain that the rate of excretion is a factor that is affected earlier in kidney disease than, let us say, the quantity excreted. The fact that large doses of uroselectan as given, for example, for intravenous pyelography may have serious consequences in cases of serious renal insufficiency, and even fatal results in the presence of such a condition as polycystic kidney, need not necessarily condemn the test, since Drs. Valli and Introzzi use smaller doses than is customary for radiological purposes. The multiplicity of renal efficiency tests however, together with the realisation that large portions of kidney tissue may be entirely destroyed before any defect in function is evident, has led to some doubt whether any dye excretion methods have much value. Whether this one is more delicate than its predecessors remains to be established.

[1] Brit. Jour. Urol., 1930, ii., 341.
[2] Med. Klin., 1931, xxvii., 1312.

A HOSPITAL AMBULANCE.—The Newcastle-on-Tyne West End Charities Committee has presented its ambulance to Newcastle Infirmary, the growth of other facilities having rendered it unnecessary for the committee to continue its own ambulance service.

TUBERCULOSIS POST-GRADUATE COURSE.—The Joint Tuberculosis Council has arranged a course of study to be held in South Lancashire from Monday, Oct. 19th, to Saturday, Oct. 24th. The course will open at 2 P.M. on Monday afternoon at the Tuberculosis Dispensary, Hardman-street, Manchester, when Dr. G. Lissant Cox and Dr. D. P. Sutherland will discuss Central Administration. On Tuesday, at 10 A.M., Dr. G. Jessel will give demonstrations at the Tuberculosis Dispensary and Light Centre, Eccles, and at 2.30 P.M. Dr. H. G. Trayer will deal with pathology and the problems of hospital treatment at the Baguley Sanatorium, Altrincham. On Wednesday, at 10 A.M., at the Manchester Dispensary, the subject of Pneumoconiosis in Stone-masons will be considered by Dr. P. Heffernan, in Miners by Dr. A. Pask, and in Cotton-operatives by Dr. G. Fletcher. At 2.30 P.M. Dr. Jessel, at the Peel Hall Pulmonary Hospital, will cover such matters as Lipiodol, Artificial Pneumothorax, Sanocrysin, and Blood Sedimentation in diagnosis and treatment. On Thursday, at 10 A.M., Dr. P. Edwards, at the Manchester Dispensary, will deal with Artificial Pneumothorax and Allied Therapy. The items will include visits to the East Lancashire Sanatorium, the Village Settlement at Barrowmore Hall, and a round-table conference and discussion on the Saturday morning. Information from Dr. W. Brand, hon. sec. for post-graduate courses, 8, Highway Court, Beaconsfield, Bucks.

SPECIAL ARTICLES

ECONOMY IN THE SOCIAL SERVICES.

REPRESENTATIVE VIEWS.

In Circular 1222, issued on Sept. 11th by the Ministry of Health, local authorities are asked immediately to subject to careful and detailed scrutiny the whole field of their expenditure, examining for example whether full value is being obtained for money spent, what savings can be made in the administrative machine in all its branches, and whether development of any services cannot safely and properly be slowed down till better times. Notice has been too short for any wide consultation of medical officers to these authorities, but we have obtained the first thoughts of some administrative heads of large medical departments, of which two samples are set out below. For obvious reasons these views, and any others which may reach us from similar sources, are anonymous, and on all sides criticism and discussion will be welcome.

I.

My view is that saving might include a drastic review of all capital expenditure scheduled for this and next financial year. Many authorities were intending to spend large sums of money on institutions transferred from the guardians, and it is difficult for them to resist demands from technical staffs for new wards, laboratories, staff quarters, equipment, apparatus, and so forth. I am certain that most of this expenditure can be postponed without irreparable loss, and in fact with some gain if it implies a review of existing accommodation.

Each service should be reviewed with an eye to adjustments making for more economical working rather than the cutting out of any particular activity. In institutions in particular a good deal of saving should be possible in the aggregate by supervision of such items as (*a*) water, electricity, gas, telephone; with comparison between the various sections. (*b*) Laundry arrangements, where the allowance is too lavish either for wards and staff. (*c*) Food wastage, with control of refuse from kitchens and wards. Staff diet to be not above the standard of an ordinary middle-class household. (*d*) Fuel, its proper use. (*e*) Stores, drugs, appliances, chemicals, dressings; with comparison of wards and methods of checking. (*f*) Routine of duties of each member of staff to be checked individually.

Disinfection of houses after infectious illness might well be reduced substantially in most cases in favour of a thorough spring-cleaning. Drain-testing as a routine after cases of infectious disease, which is still often done, is sheer waste of time and energy.

Economies might be made in the use of hospital beds. (*a*) Far too many mild cases of scarlet fever are admitted to fever hospitals instead of being nursed at home. Scarlatinal serum can be supplied to practitioners to minimise complications. (*b*) A considerable proportion of the cases of diphtheria sent in by practitioners to hospital are not clinically diphtheria. They are often sent out on or about the tenth day, but even this is too long. (*c*) Public assistance institutions for acute or chronic sick, aged or infirm, might be greatly relieved if district medical officers were not so ready to send patients into institutions instead of continuing treatment and supervision at home. An increase in medical and relieving officers to meet their requirements would pay handsomely. Institutions cannot at present refuse to accept patients sent in by the relieving officer, many of whom would prefer to remain at home with a little help. (*d*) Colonies and schools for mental defectives tend to become too elaborate, too luxurious, and too technically staffed, and the same is true of nursery schools. I do not think these should be cut out, but they should be run with a more modest eye.

Much of the work under the Food and Drugs Acts could be cut out if the Ministry of Health would lay down more drastic standards and conditions of food preparation.

At infant welfare centres the machinery should be overhauled to see whether each member of the staff is pulling full weight. The supplying of milk, fresh or dried, through such centres is a grave waste of energy and damages their value as advisory centres. If mothers were referred for foods to the public assistance there would be less temptation to trade on the local authority. Much time is wasted by health visitors or school nurses in calling twice or more on cases of minor infection reported from school; the first visit to detect, the second to release for school. The leaving at the first visit of a slip with date for return entered by the health visitor would save time for more important work; parents helped by attendance officers rise quite well to their responsibilities.

To summarise. The lines of action seem to be: the saving of bricks and mortar; careful review in detail of each service, with pruning everywhere rather than cutting out any one section; particular regard to extravagant administration of institutions; the need for the staff to remember what would be their own standard if they were living on their own income at home.

II.

The proposed cut of £150,000 in the direct cost to the Exchequer of public health work reflects only to a very slight extent the cuts which it is anticipated local authorities will make, in view of the fact that the Local Government Act of 1929 abolished percentage grants for most of the public health services, consolidating these grants in a block grant in which the new budgetary proposals make no alteration. This means, of course, that savings effected by local authorities will not appear as any reduction in Government expenditure. The only services directly administered through health departments which remain on the percentage grants, and cuts in which will therefore appear in the £150,000, are the port sanitary service and the school medical service. Fifty per cent. of any savings in the former cannot amount to much, but school medical inspection and treatment are expensive. If it is proposed to slow up housing schemes this would account for a substantial proportion of the £150,000.

Circular 1222 points out that other local government officers should in equity share in the reductions which the Government have been able to impose upon teachers and the police. Such reductions will, for the reasons given, make little difference to the Exchequer, but will, if they are in anything like the same proportion, effect substantial economies in local administration. A large proportion of the expenditure of public health departments is attributable to salaries, and that must apply to all service

which depend mainly on personnel and not so much upon occupation of premises and provision of goods.

As regards the relative value of the different medical services, there will be great variety of opinion. Nearly all of them are of recent establishment, and aim at conserving and improving the health of children and teaching them how to lead healthy lives, so that they may reach adult life fit to enter employment and capable of looking after their own health when they have left our hands. It will take a generation to tell whether these services have done what they set out to do, and even then the picture will be confused, because of the effect upon health of fluctuations in the standard of living. All we can say is that they are doing something to meet a need which has been obvious for many years, not only to the medical profession, but also to every thinking member of the community, and that it can be demonstrated in individual cases that they are doing good. In some areas, perhaps many, measures have been adopted which are not worth the money spent on them.

Special schools for the mentally defective are expensive, and would become a serious item of expenditure if they were sufficiently developed, as they are not in most areas. They are, however, serving not only the purpose of educating defectives, but, more important still, of removing from ordinary school classes children who are a terrible drag on their work. Many people would be surprised to learn the extent to which definitely defective children who have been taught in these special schools are employed and doing good work even at this time of grave unemployment. Indeed, there is something in the methods of teaching adopted in these schools which I hope will convey a lesson applicable to the ordinary school child.

I should rather see a pound or two saved here and there on our services than the crippling of any one of them. It has been my view for many years that too much emphasis has been laid upon housing in relation to ill-health, and that more has been spent on housing than we can afford. In view of the provision which has already been made by local authorities, and the certainty that the population will shortly be on the down grade, I think expenditure on housing should receive careful scrutiny.

I should not be sorry if shortage of money forced us to reconsider some of our well-established practices in relation to the control of acute communicable disease. Disinfection could certainly be cut down without disastrous results, but as an item of expenditure it is comparatively trivial. Child welfare centres for healthy children cost very little, and their work is of the genuinely preventive kind, which I think it would be most unfortunate to discontinue. We spend a great deal too much money on the hospital isolation and treatment of scarlet fever, because the medical profession and the public have come to expect it. In order to deal with epidemic fluctuations of this disease, we retain a number of beds and a considerable staff, which costs money. Moreover, we isolate and treat a very large proportion of all the cases of diphtheria, however mild, which occur in towns, because we cannot risk allowing a disease which has still a considerable percentage fatality to spread among the children in populous areas. Diphtheria immunisation, and possibly also scarlet fever immunisation, although they are not all that America has led us to believe, are of a sufficiently proved prophylactic value to merit their adoption on a much larger scale than they have been practised in this country.

The national maternity scheme will now be definitely suspended, and, I think, without serious hardship. The proposal was merely a consolidation of measures already taken piecemeal. I do not think that midwifery will suffer immediately to any material extent as the result of its postponement. In any case it was bound to be a matter of many years before any such scheme became efficient.

To sum up, I am all out for economy in administration, and strict supervision of every detail of expenditure. It is possible for big public departments to be grossly extravagant in small items, the cumulative effect of which is quite substantial. Some local authorities approach public health administration from a sentimental, rather than a business, point of view, and a medical officer encouraged in this way is not likely to concern himself much about details of costs. If I had to recommend curtailment of expenditure on any one branch of my work, I should be inclined to select the institutional segregation of mental defectives.

A STUDY OF CONTACT INFECTION IN TUBERCULOSIS.

By H. Midgley Turner, M.D., D.P.H. Manch.,

CLINICAL TUBERCULOSIS OFFICER TO THE CITY OF SHEFFIELD; LECTURER IN TUBERCULOSIS, SHEFFIELD UNIVERSITY.

An outline of the investigation upon which this paper is based has been given in a previous communication.[1] That contained the actual results of gross tuberculous infection among 833 contacts of the 185 households of fatal sputum-positive cases of phthisis which were investigated in North Worcestershire. It is my intention here to carry the analysis somewhat further, in an attempt to estimate the part played by various factors in the ætiology of the secondary tuberculosis which occurred in this group of house contacts.

1. SEX OF THE CONTACT.

TABLE I.—*Contacts of the Age-group 0–5 Years.**

Children 0–5 years.	No.	Death-rate per 1000; all causes.	Tuberculosis death-rate per 1000.	Total tuberculosis incidence per 1000.
Male	85	200	94·1	188·2
Female	71	211·3	42·3	183·1

Table I. shows that the sex of the contact seems to have little influence upon either the death-rate from all causes or upon the total tuberculous incidence-rate. The tuberculosis death-rate is, however, significantly heavier among male infants. Female children appear to resist the disease better than male children up to the age of 5 years, but a conclusion is hardly justified on account of the small number of deaths involved.

The results shown in Table II. allow of the following conclusions:—

(1) In the age-groups 5–15, 15–25, and 35–45 years, the phthisis incidence-rates are greater among females in sputum-positive households than among males. (2) Among contacts over the age of 45 in sputum-positive households the phthisis incidence-rate is

* In order to avoid a statistical fallacy, the 0–5 years age-group of contacts has been dealt with by a special method. The reasons for this method and the method itself have been outlined in a previous communication.

greater among males than among females. (3) The phthisis death-rate is significantly greater among female contacts up to the age of 25 than among male contacts. Over this age the male death-rate from phthisis is greater than the female death-rate. (4) The greatest death-rate and the greatest incidence-rate from phthisis among female contacts fall in the age-group 15–25. (5) The greatest death-rate from phthisis among male contacts is found in the 15–25 age-group, but the greatest incidence-rate occurs in the age-group 25–35. (6) Among contacts over 5 years old the incidence of phthisis is greater among females than among males in the ratio 100 : 70. The death-rate from phthisis is also greater among female contacts over 5 years than among contacts of the male sex over 5 years, in the ratio 100 : 84.

TABLE II.—*Tuberculosis Morbidity and Mortality Among House Contacts Over 5 Years of Age.*

(Rates per 1000 contacts in each sex age-group.)

Age-groups.	A. Male Contacts.					B. Female Contacts.				
	Contacts.	Death-rates.		Incidence-rates.		Contacts.	Death-rates.		Incidence-rates.	
		N.P.T.	P.T.	P.T.	All forms		N.P.T.	P.T.	P.T.	All forms
5–15	81	12·3	—	73·9	110·9	89	11·2	11·2	89·8	157·2
15–25	98	—	40·3	91·8	102·0	96	—	62·5	187·4	197·8
25–35	52	—	35·5	96·2	96·2	64	—	31·3	125·1	125·1
35–45	21	—	—	95·2	95·2	48	—	20·8	125·0	125·0
45–up	82	—	12·2	36·6	48·8	104	—	—	28·8	28·8

N.P.T. = Non-pulmonary tuberculosis. P.T. = Pulmonary tuberculosis.

Thompson [2] said: "If we once grasp the idea that the male has a superior power of resistance to attacks of phthisis than the female, we shall experience no difficulty in understanding the apparent anomalies in family phthisis." It may be suggested that the heavier incidence of phthisis on female contacts is due to their greater domesticity and consequent increased intimacy of contact, and not to any constitutional inferiority in resisting power. This may be a factor, but it is significant that over the age of 45 the phthisis-incidence is greater among men than among women in these sputum-positive households, for women do not become less domesticated after the age of 45 is reached. I suggest that the greater susceptibility of the female to gross contagion in the home during her active sexual life can be explained by application of the theory of allergy.

During menstruation there is a depression of the allergic state (as measured by tuberculin skin reactions); this also obtains during pregnancy and parturition (Baldwin, Petroff, and Gardner [3]). Thus an infected female between the ages of 12 and 45 is continually undergoing cyclical variations in allergy, whereas a male continuously exposed to gross infection has a gradually increasing degree of allergy. At the menstrual period the female can be infected by a smaller dose than the male. Two weeks later she will now react to tubercle bacilli more vigorously than the male. Such an alternation is likely sooner or later to produce manifest disease.

This application of the theory of allergy would explain the greater susceptibility of the female during active reproductive life. It would also explain why active tuberculosis rarely shows itself until the puerperium. During pregnancy the degree of allergy is lowered, so that the pregnant woman is easier to superinfect, but is less likely to react vigorously to superinfections. In the puerperium the rise in the degree of allergy initiates reactions round foci of tubercle bacilli which previously did not provoke reactions, and manifest disease may result from these reactions.

It must be recognised that this is pure theory, but I feel that it has the merit of allowing some visualisation of the possible processes at work.

2. SEX OF THE PRIMARY SPUTUM-POSITIVE CASE.

Table III. affords the following conclusions:—

(1) Among contacts up to the age of 15 in an infected household the tuberculosis incidence and the death-rate are greater where the source of infection is a female than where the source of infection is a male. (2) Contagion in a household is equally dangerous to contacts between the ages of 15 and 35, whether the infectious case is a male or a female. (3) The evidence is suggestive, but not conclusive, that among contacts over the age of 35 the tuberculosis incidence is greater where the infectious case is a male than where the infectious case is a female.

TABLE III.—*Rates per 1000 in each Age-group.*

Age-group.	Contacts of male infectious cases.			Contacts of female infectious cases.		
	No. in group.	Tb. D.-R.	Tb. I.-R.	No. in group.	Tb. D.-R.	Tb. I.-R.
0–5	94	53·2	106·4	62	96·8	177·4
5–15.. ..	97	10·3	103·1	73	27·4	178·1
15–35.. ..	163	49·1	128·9	147	40·8	142·8
35–up ..	133	7·5	67·7	122	8·2	49·2

Tb. D.-R. = tuberculosis death-rate. I.-R. = incidence-rate.

AGE OF THE PRIMARY SPUTUM-POSITIVE CASE.

The age of 35 was selected as a dividing line; thus the contacts are divided into two groups. The first group, A, is made up of contacts in households where the sputum-positive case was under 35 years of age at death. The second group, B, is made up of contacts in households where the sputum-positive case was aged 35 years or over at death.

TABLE IV.—*Rates per 1000 in each Age-group.*

Age-group.	A. Contacts of cases under age 35.			B. Contacts of cases over age 35.		
	No. in group.	Tb. D.-R.	Tb. I.-R.	No. in group.	Tb. D.-R.	Tb. I.-R.
0–5	90	77·8	166·7	66	60·6	90·9
5–15.. ..	89	22·5	134·8	81	12·3	135·8
15–35.. ..	197	40·6	162·4	113	53·1	88·5
35–up ..	170	11·8	47·1	85	—*	82·4

—* = No deaths.

It will be noticed in Table IV. that contacts under 35 years' old suffer a significantly greater tuberculosis incidence when the infectious case is also under 35 than where this case is over 35. On the other hand, contacts over 35 suffer a heavier tuberculosis incidence when the primary case is also over 35. It also appears that, in the aggregate, sputum-positive cases

under 35 cause more secondary tuberculosis in the home than do sputum-positive cases over 35. Thompson [3] stated that "the transmission of the developed disease from the parents is stronger before 40 than after 40." These results cannot be taken as complete confirmation of the principle involved in Thompson's statement, for it must be remembered that they only give the tuberculous morbidity and mortality among these contacts up to a time not exceeding two years after the death of the primary case. These morbidity- and mortality-rates are not end-results; they really represent the early results of gross tuberculous contagion in the home. Sputum-positive cases under 35 years of age in the lower classes tend to follow a steadily progressive course and to be continuously infectious during the morbidity period. Sputum-positive cases over this age, on the other hand, tend to be more chronic in type, and are frequently only intermittently infectious. It is possible, therefore, that much of the secondary tuberculosis due to infection by the older infectious cases is only manifested at a longer interval than two years after the death of the primary case. In a previous investigation,[4] working from entirely different premises, I found that the secondary-case-producing power of a sputum-positive or fatal case of phthisis in the home increased with increasing age of the infecting case. From the present results, therefore, the only conclusion warranted is that early results of infection in the households of sputum-positive cases are greater where the primary case is under 35 than where the primary case is over 35 years of age.

"CONTACT HISTORY" OF THE PRIMARY SPUTUM-POSITIVE CASE.

For the analysis of the effect of this factor on the tuberculosis incidence, the contacts were divided into two groups: (*a*) contacts with a sputum-positive case which itself had a home contact history; and (*b*) contacts with a sputum-positive case which had no history of home infection. Thus contacts in section A, as a group, represent households with a family history of phthisis—i.e., in many cases a phthisical heredity. It must also be remembered that many of the section A contacts over the age of 5 years have been exposed to gross tuberculous contagion in the home for the second time. Table V. shows the tuberculosis incidence and death-rates in the two groups of contacts, A and B.

TABLE V.—*Rates per 1000 in each Group.*

Age-group.	Group A contacts.			Group B contacts.		
	No. in group.	Tb. D.-R.	Tb. I.-R.	No. in group.	Tb. D.-R.	Tb. I.-R.
0–5	67	104·5	194·1	89	44·9	89·8
5–15.. ..	69	14·5	202·9	99	19·8	89·1
15–35.. ..	117	85·5	247·9	193	20·7	62·1
35–up ..	89	11·2	78·6	166	6·0	42·1

The incidence of tuberculosis is very significantly greater at all ages among contacts of sputum-positive cases who themselves had a history of home contact with pulmonary tuberculosis than it is among contacts of sputum-positive cases who themselves had no history of house contact with pulmonary tuberculosis. The tuberculosis death-rate is very significantly greater among contacts in age-groups 0–5 and 15–35 years of sputum-positive cases who themselves had a history of house contact with pulmonary tuberculosis, than it is among contacts, in the same age-groups, of sputum-positive cases who had no history of previous house contact with pulmonary tuberculosis.

I believe that infection alone will not explain the results of this analysis, but that heredity must also be taken into account. The nature of hereditary predisposition, if it exists, whether it is a specific inherited susceptibility to tuberculosis or whether it is an inheritance of metabolic variations which favour the development of tuberculosis, must be left for further research.

SIZE OF THE HOUSEHOLD.

In the analysis for the effect of this factor the contacts are divided into two groups, according to whether they belong to a household of more than six individuals, or to a household of six or less. (Table VI.)

TABLE VI.—*Rates per 1000 in each Group.*

Age-group.	A. Households over 6.			B. Households 6 and under.		
	No. in group.	Tb. D.-R.	Tb. I.-R.	No. in group.	Tb. D.-R.	Tb. I.-R.
0–5	72	97·2	152·8	84	47·6	119·0
5–15.. ..	87	23·0	69·0	83	12·0	204·8
15–35.. ..	138	50·7	166·6	172	40·7	110·5
35–up ..	88	11·4	79·6	167	6·0	48·0

The tuberculosis incidence is greater in the large households for contacts in age-groups 0–5, 15–35, and 35 years and up, but in the age-group 5–15 of contacts the tuberculosis incidence is greater in small households. I think the explanation of these results lies in the fact that the tuberculosis incidence among contacts increases with the intimacy of the contact. Thus for the age-groups 0–5, 15–35, and 35 and up, increase in the size of household is associated with increased intimacy of contact. For children aged 5–15 this does not hold. Where there are a number of young children in a lower-class household the tendency is for them to spend a great deal of their time out of doors, for the children do not wish to be in, and the parents prefer them out of the way in the daytime. Where there is only one, or possibly two, children of this age, the tendency is for the parents to pay more attention to them, with the result that the child spends more time in the infected home. Another point is that while children in large households may be crowded together, it is rare for them to be crowded with the sputum-positive case, whereas in other age-groups overcrowding leads to bed-sharing with the infectious case.

BED-SHARING.

Bed-sharing.—The small number of children aged 5–15 years who shared a bed with an infectious case renders comparison in this age-group worthless; this confirms the point made above in discussing the results of overcrowding on the tubercle incidence in the 5–15 years age-group. (Table VII.)

The terrible results among infants who shared a bed with an infectious case of phthisis speak for themselves. Between the ages of 15 and 35 years the incidence of tuberculosis is almost twice as great among contacts who shared a bed with the infectious case as it is among contacts who slept apart from the

infectious case. Over the age of 35 the results do not show that sleeping with an infectious case increases the risk of tuberculosis to the contact. Most of the bed-sharers over 35 are consorts of the

TABLE VII.—*Rates per 1000 in each Group.*

Age-group.	Contacts who shared a bed with an infectious case.			Other contacts.		
	No. in group.	Tb. D.-R.	Tb. I.-R.	No. in group.	Tb. D.-R.	Tb. I.-R.
0–5	31*	129·0	—	125†	56·0	—
15–35.. ..	73	54·8	205·5	237	42·2	113·9
35–up ..	58	—	51·7	197	10·2	61·0

* Died, all causes, 548 per 1000.
† Died, all causes, 120 per 1000.

infectious case—i.e., they are not of the same stock. Hence heredity may again be a factor influencing the results.

CONJUGAL TUBERCULOSIS.

From among the given series of cases and contacts, I was able to extract 110 married partnerships, one partner of which either died of tuberculosis or suffered from phthisis with the tubercle bacillus in the phlegm. The following are the details of tuberculosis among the consorts :—

Died of phthisis (all sputum-positive) ..	4	11
Living cases of phthisis, sputum-positive ..	5	
" " " sputum-negative ..	2	
Died of other causes	2	
Healthy	97	
Total	110	

This gives a conjugal tuberculosis-rate of exactly 10 per cent. This is very high compared with other published data. Fishberg [5] found in 2·5 per cent. of 170 couples that both the husband and wife were phthisical. Mongour [6] found in 2·9 per cent. of 440 couples that both husband and wife were phthisical. Haupt, quoted by Fishberg,[5] found in 7 per cent. of 1553 couples that both husband and wife were phthisical. These authors do not state that the primary case of tuberculosis in each partnership was sputum-positive. It is obvious that, if sputum-negative cases of phthisis are included in the series of primary cases, the conjugal-rate will be much lower than where all primary cases are sputum-positive. Dickenson,[7] in a series of 1635 sputum-positive cases among married patients, found 141 instances (8·6 per cent.) of conjugal tuberculosis.

It is interesting to note that among the 110 married couples extracted from the Worcestershire series the conjugal tuberculosis-rate was greater among wives than among husbands. Thus in 42 instances the wife was the primary case and of the consorts 3, or 7·1 per cent., developed phthisis ; whereas in 68 instances where the husband was the primary case, 8 of the consorts, or 11·8 per cent., subsequently manifested phthisis.

COMMENT.

While the theory that resistance to tuberculous infection is closely associated with the allergic state has been largely used in the foregoing explanations and reasoning, it is well to remember the limitations of this theory. Allergy only governs the response of the body to those tubercle bacilli which gain access to the tissues. While it may determine whether such organisms be destroyed or allowed to live on in the tissues at their point of entrance, it is unlikely that it governs the number of tubercle bacilli which gain access. In all probability the ease with which tubercle bacilli gain access to the tissues depends on what might be termed the "permeability" of the mucous membranes. It is known that the permeability of mucous membranes is greater in the first few days of life, but it seems possible that there may be great variation of this permeability between individuals even of the same age. If this were the case, two people exposed for the same length of time to the same concentration of contagion would not necessarily receive the same dose of infection. It is also possible that the permeability of mucous membranes may be in part an inherited tendency, and in part an acquired tendency. Thus phthisical families might have a biological characteristic of more easily permeable mucous membranes than the normal. The effects of occupation and disease might be to alter the inherited permeability of the mucous membranes in one direction or the other. There seems to be no reason why the resistance due to allergy and the resistance due to impermeable mucous membranes should be related to one another. This subject well merits careful investigation. In the absence of definite knowledge, it is well to bear in mind the possibility that some individuals may be resistant to tuberculosis because they are difficult to infect, while other individuals may be resistant to tuberculosis because the infection, having gained access to the tissues, cannot maintain a foothold against the tissue reactions.

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MEDICINE AND THE LAW.

"Establishments for Special Treatment": the Requirement of Licensing.

Part IV. of the London County Councils (General Powers) Act of 1920 prohibited the carrying on of "establishments for massage or special treatment" unless under licence. Under this enactment a Turkish doctor, holding a diploma from the medical faculty of Constantinople, was summoned last month for carrying on an establishment in Regent's Park where high-frequency and solar-ray treatment was given. The Act defines "establishment for massage or special treatment" as meaning any premises used (or represented as being or intended to be used) for the reception or treatment of persons requiring massage, manicure, chiropody, light, electric, vapour or other baths or other similar treatment. The defendant said he never gave light, electric, vapour or other baths. He understood the word "bath" to imply that the patient was undressed and entered a box or bath for treatment; this did not occur at his establishment. He said he used three solar lamps and two high-frequency instruments for local application. The magistrate at Marylebone Police-court held that these treatments were within the prohibition and could not be administered without licence. As, however, the defendant appeared

to have a bona-fide belief that no licence was required, the summons was dismissed under the Probation of Offenders Act on payment of three guineas costs.

The compulsory licensing provision does not apply to establishments carried on by registered medical practitioners who comply with certain prescribed formalities, nor to recognised hospitals and infirmaries; there is also an exception for hairdressers who give face or scalp massage or manicure treatment to female customers. An applicant for a licence must state his or her name, age, nationality, and technical qualifications as well as the nature of the proposed establishment and the business to be carried on. Some years ago scandals in connexion with bogus massage establishments were not unknown. The London County Council Act authorises the licensing authority to make by-laws "for the prevention of immorality" in licensed establishments, and for the keeping and inspection of records showing the persons employed and the general character of the business. Authorised officers of the L.C.C. may enter and inspect premises. An equally important point is that the by-laws may also prescribe the technical qualifications to be possessed by persons administering massage or other curative treatment. The London County Council Act of 1920 was not the first provision of its kind. There had been, for example, similar statutory requirements in Part V. of an earlier Act of 1915. The 1920 Act was closely followed in a Local Act obtained by Manchester in 1924. The Surrey County Council Act which received the Royal Assent at the end of last July contains provisions framed on the same lines but with a slightly wider definition of establishments for special treatment.

BUCHAREST.

(FROM OUR OWN CORRESPONDENT.)

OATS DIET IN DIABETES.

SOME years ago a German author claimed that an exclusive diet of oats has value in severe cases of diabetes mellitus, and now Dr. Oberth, of Brasov, publishes some further observations on this method of treatment. He has treated about 100 cases with varying results. The diet consists of oats given in large quantities, in the form of oat flour or flakes, together with albumin and butter, excluding all other carbohydrates and meat. The usual daily allowance consisted of oats 250 g., albumin (vegetable or from eggs) 100 g., and butter 300 g. This mixture was made into a soup and given every two hours. Wine or light brandy was occasionally allowed, and also strong black coffee. Dr. Oberth details a number of typical cases in which this régime was tried, and says that it seemed to give more favourable results than did other diets recently proposed. He does not, however, advise its adoption without careful preliminary trial in any particular patient, for he has observed cases in which it made the patient worse. The theoretical basis of this diet is under investigation.

BLOOD CHANGE AFTER HÆMORRHAGE.

In a recent lecture to the Medical Society Dr. Niculescu recorded some comparisons of the effect of hæmorrhage upon the composition of the blood in untreated persons, and in those being treated with arsenic and iron. He found that hæmorrhage produces more marked effects in the former. The leucocytes are increased, the change consisting chiefly of an increase of the polymorphonuclears, occasionally of the mononuclear cells. The solids, proteins, and total nitrogen of both blood and serum are affected to more or less the same extent. The qualitative change in the serum proteins consists in a relative increase of serum-albumin. The fibrin is increased and the coagulation-rate shortened. The blood-ash remains practically unchanged. Hæmorrhage during the administration of inorganic iron produces less deterioration in the blood than when the patient is untreated, and the administration of organic iron seems even more efficacious in preventing damage. The administration of arsenic alone has little effect except the number of leucocytes appears to be diminished instead of increased in this group of cases after hæmorrhage. The combined administration of iron and arsenic was found effective in diminishing the effects of hæmorrhage on the composition of the blood.

THE FATE OF GALL-BLADDER CASES.

A questionaire has recently been circulated to patients who have been operated on by certain well-known surgeons for gall-bladder disease, excluding cases of carcinoma. The object was to determine the results and after-effects of the operation. The statistics obtained suggest that the relief is generally permanent and the danger slight. Gall-stones had been deliberately left in one case, since the relation of the biliary ducts was so complex that no radical procedure could be attempted. Most of the other cases remained free from symptoms, and only in one case was a second operation required. Among 35 cases only one mucous and one biliary fistula resulted, and herniæ occurred in only two cases where suppuration had been extensive. Colic, due to adhesions, was reported by three patients; in two of these the appendix was removed, and in one a gastro-enterostomy had been performed. The suggestion is made that renal colic must be excluded before recurrent biliary pain colic is diagnosed, since the conditions have many symptoms in common.

VIENNA.

(FROM OUR OWN CORRESPONDENT.)

NEW PROFESSORS.

WITHIN the last year six chairs of the University of Vienna have become vacant—partly through death or illness, and partly through the age-limit. Every professor attaining the age of 70 is required by law to resign his position within the next year. The surgical professors Eiselsberg and Hochenegg resigned owing to age; the gynæcologists, Kermauner and Peham, died within half a year of each other, and both clinics for materia medica are vacant through the illness of Wenckebach and Ortner. After protracted negotiations with various scientists, the two gynæcological clinics have now been given to Prof. Georg Wagner, of Berlin, and Prof. William Weibel, of Prague. Both men were students at Vienna at the famous old school Scheuta-Chrobak-Wertheim. Ortner's post has been taken over by Prof. Jagie, well known for his researches on blood and liver function; Wenckebach's is still vacant. One of the surgical clinics has been filled by Prof. Wolfgang Denk, hitherto chief of the surgical clinic of Graz, and a pupil of Eiselsberg. It is expected that the other surgical clinic will be accepted by Prof. Paul Clairmont, at present in Zürich, also a pupil of Eiselsberg. The directorship of the institute of orensic medicine, at present nominally held by

Prof. Habenda, who has long been an invalid, will be taken over by Prof. Karl Meixner, at present in Innsbruck. There will thus be many changes in university circles in the coming session.

THE LATE PROF. KOLMER.

News of the sudden death of Prof. Dr. Walter Kolmer came as a shock to the large number of his students and admirers. At the age of 52 he succumbed to an attack of heart failure while on a climbing holiday in the Alps. Prof. Kolmer was famous for his intimate knowledge of the fine anatomy of the eye, ear, and nose, and was also an authority on special sense physiology and on the morphology and histology of nervous structures. His command of comparative anatomy and histology of both the vertebrate and invertebrate animals made him an ideal director of the Institute of Morphologic Physiology attached to the University of Vienna. His early death is particularly unfortunate in that he had started building up a school of promising young researchers, none of whom is yet experienced enough to take his place.

ALARMING INCREASE OF THE NUMBER OF MEDICAL MEN.

The Municipal Board of Health published, in August, some interesting statistics dealing with the staffs of hospitals and with other medical men in practice in Vienna. It appears from the figures, that in December, 1930, 4732 practitioners and specialists were registered as entitled to practise besides 1823 dental surgeons and dentists; 11 per cent. of the medical practitioners were women, and 9 per cent. of the dentists. In the previous year there were only 4651 practitioners (475 women) and 1770 dental surgeons. The ratio of medical practitioners to population is now 1 : 3800, and that of dentists 1 : 1000. The situation is made more serious by the system of sickness insurance. During 1931 the output of graduate medical men from the University has increased still more and warnings against taking up the study of medicine have been issued by various corporations and boards. It is pointed out that the population of Vienna is slowly but steadily decreasing (from 2,000,000 in 1920 to 1,810,000 at present) and that the supply of medical men in Vienna is more than sufficient.

AUSTRALASIA.

(FROM OUR OWN CORRESPONDENT.)

ANTIVENINE BY AIRPLANE.

THE mortality from snake-bite has remained stationary in this country during the past 15 years. As a direct result of extensive research into the pathology of snake-bite conducted at the Walter and Eliza Hall Research Institute at Melbourne by C. H. Kellaway and N. Hamilton Fairley, a supply of antivenine specific against tiger snake (*Notechis scutatus*) is now commercially available. Production was effected by coöperation of the Commonwealth Serum Laboratories with the research workers, and the serum is stocked by the depôts of the Commonwealth Department of Health throughout Australia. The problem of distribution is particularly difficult owing to the rural occurrence of the snake-bite. The State of Queensland, for instance, where the highest mortality from snake-bite occurs, has an area of 670,500 square miles, which is served by five serum depôts. The difficulty of distribution is accentuated by the high cost of the serum. The recommended dose of 6000 units costs retail £8 16*s*., and the country pharmaceutical chemist cannot be expected to outlay this amount on stock which might never be used. The solution of the difficulty lies in the use of the aeroplane in providing rapid transport of the serum, and fortunately airway communications in Australia are highly developed. This method has a parallel in the organised effort of the Antivenine Institute of America.

EMPIRE CONSULTATIONS.

A few days ago a medical man in Melbourne, Victoria, was anxious to obtain without loss of time the opinion of a British neurologist on the diagnosis of a particularly difficult nerve case which was in a hospital in Melbourne. With the consent of the relatives, he established telephonic communication with London, the history of the case was given, and a subsequent telephone communication a few hours later resulted in a helpful discussion. In order to facilitate consultations in the future copies of the London Telephone Directory would have to be available at various centres.

TOLL OF THE MOTOR VEHICLE.

With the increase in the motor vehicles in commission and the growth of the population, the greater will be the opportunities for misadventure and the longer will be the roll of victims of motor-car accidents. Statistics, however, show that the three factors concerned—namely, number of motor-cars, growth of population, and number of casualties do not bear uniform relation. Figures issued by the Government statistician of deaths caused by motor accidents in New South Wales last year show an increase of 24·5 per cent. in the number of such deaths, while during the same period the population increased by 1·6 per cent., and the average number of cars registered by 13·4 per cent. In other words, the increase in the fatality-rate far exceeds the increases in the other directions. The great majority of the pedestrians involved in accidents were either under the age of 15 or over the age of 64.

MATERNITY ALLOWANCE REDUCED.

As a result of the financial stringency the Commonwealth Government has announced that, as from July 20th, 1931, the maternity allowance has been reduced from £5 to £4, and will only be paid to parents who have an income less than £260 per year. It has for long been realised that the bonus has failed in its object of increasing the birth-rate and reducing the maternal mortality-rate. The bonus was claimed by large numbers of parents who were really not in financial need of it, and the annual expenditure of £750,000 is one which the country cannot afford.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE.

Surg. Lt. D. C. Drake is promoted to the rank of Surg. Lt.-Comdr.

The following appointments are announced: Surg. Comdrs. R. F. Quinton to *Vivid*, for R.N. Barracks, Devonport; and G. F. Syms to *Victory XI.*, for R.N. Hospital, Portland.

ROYAL NAVAL VOLUNTEER RESERVE.

Surg. Lt.-Comdr. J. B. Oldham to *Victory*, for Haslar Hospital; and R. W. H. Tincker to *Pembroke*, for R.N. Barracks.

ROYAL ARMY MEDICAL CORPS.

Lt.-Col. M. D. Ahern, having attained the age for compulsory retirement, is placed on retd. pay.

Maj. (temp. Lt.-Col.) E. M. Middleton to be Lt.-Col.

(*Continued at foot of next page.*)

PUBLIC HEALTH SERVICES

LOCAL GOVERNMENT ACT OF 1929.

EARLY RESULTS.

ALTHOUGH poor-law functions were only transferred to county and county borough councils on April 1st, 1930, considerable progress in unification had been made by the end of the year, according to the report of the Chief Medical Officer of the Ministry of Health.[1] Appropriations of particular poor-law institutions or parts of institutions for special purposes have already been made by 20 county boroughs for purposes under the Public Health Acts; by three county boroughs for purposes under the Maternity and Child Welfare Act; and by one county borough and four county councils for purposes under the Mental Deficiency Act. In one or two instances the management of the poor-law infirmary has been assigned to the public health committee of the council, acting on behalf of and subject to the public assistance committee. As yet no county council except that of London has appropriated a transferred poor-law institution as a general hospital; the problem of hospital provision in a county is usually much more difficult than in a county borough, but active steps have been taken in many counties to survey the institutions available and to prepare reports.

As soon as an institution is appropriated for hospital services under the Public Health Act, its management passes from the public assistance to the public health committee, thus facilitating coördination of the work of the hospital with that of the other health services in the area. Further, the hospital ceases to be under the control of a master and comes under that of a medical superintendent. The report points out the importance of giving consideration to the best way of developing the hospital to meet the local needs and to avoid competition; it recommends early consultation with the representatives of the voluntary hospital authorities and a review of the adequacy of the staff—medical, consultant, and nursing.

[1] On the State of the Public Health, Chap. ix. H.M. Stationery Office. 1930. 4s.

WAYS OF COÖRDINATION.

If tuberculosis is treated at a municipal hospital, coöperation with the tuberculosis dispensary can perhaps be secured by the appointment of the tuberculosis officer as a consultant on the staff of the hospital. There is a great deal of scope in many districts for better coördination of the maternity and child welfare, the school medical, the tuberculosis, and the venereal disease services, all of which have been developed under separate schemes with a tendency to neglect each other. The report urges team-work between the various specialist medical officers of the local health authority; for instance, the medical officers of the maternity and child welfare service should take full advantage of facilities for diagnosis and treatment of venereal disease, and sometimes it is useful to hold special sessions at a venereal disease clinic for maternity and child welfare cases. The greatest field of all for coöperation, the report suggests, is between maternity and child welfare on the one hand and the school medical service on the other. The distinction between the pre-school child and the school child is such a purely arbitrary one from the point of view of health that the two services should be inseparable parts of one whole, yet certain forms of treatment are often provided for school-children while no corresponding provision is made under the maternity and child welfare scheme. There is a great deal to be said—the report continues—for combining the staffs of the maternity and child welfare and the school medical services, and perhaps for allotting areas to particular medical officers and health visitors who carry out the work of both services, thus avoiding the obvious disadvantages of having two nurses visiting at the same house. It may further be possible to combine the duties of tuberculosis nurse with those of health visitor and school nurse.

THE PUBLIC HEALTH SERVICES.

Under the new Act local authorities are given much greater freedom of action in the future development of their health services. The approval of the Minister is only necessary for their proposals when required by the relevant statute. The Minister has to sanction any modification of the approved schemes or arrangements which would reduce the provision already made, and also certain modifications which would extend the services, but in Circular No. 1072, issued by the department in February, 1930, the Minister's general sanction was given for the extension on recognised lines of existing services already approved. The Minister must be satisfied that the local authorities are achieving and maintaining a reasonable standard of efficiency and progress in the discharge of their public health functions, and for this purpose a periodical survey has been arranged by medical officers of the department. At the time of publication of the report, surveying medical officers had visited 36 areas and had been welcomed in all parts.

The problems of London have been complicated by the magnitude of the area and by the administrative relationship existing between the county council and the Metropolitan borough councils. It was a formidable task to allot equitably the available accommodation between the central public health committee, which was responsible for the acute and

(*Continued from previous page.*)

Maj. G. F. Dawson to be temp. Lt.-Col.

Lt. J. M. Gibson is placed on the half-pay list on account of ill-health.

INDIAN MEDICAL SERVICE.

Capt. S. D. S. Greval to be Maj.

COLONIAL MEDICAL SERVICES.

Dr. D. Duff to be Deputy Director of Medical Services, Gold Coast; Dr. J. W. Field to be Malaria Research Officer II, Institute for Medical Research, Federated Malay States; and Dr. A. M. W. Rae to be Medical Officer, Sierra Leone.

The following appointments have been made recently: Dr. S. J. Arthurs, Medical Officer, Jamaica; Dr. I. J. Cruchley, Medical Officer of Health, Jamaica; and Dr. T. Wilson, Medical Officer, Malay States.

DEATHS IN THE SERVICES.

Surgeon Lieut.-Colonel Sir Warren Roland Crooke-Lawless, who died at Folkestone on Sept. 14th, at the age of 68, entered the Army Medical Department in 1886, and was subsequently posted to the Coldstream Guards. He served throughout the South African War (mentioned in dispatches and promoted to lieutenant-colonel, Queen's medal, six clasps, King's medal, two clasps). He was surgeon to the late Lord Minto when Viceroy of India, and was made C.I.E. in 1907. In 1910 he was knighted, and retired in the following year.

In the Great War he was mentioned six times in dispatches, and received the C.B. and C.B.E. in 1917. From 1920 to 1924 Sir Warren was house governor and medical superintendent of the King Edward VII. convalescent home for officers at Osborne, and on retirement received the K.C.V.O. He married, in 1894, Emily Anne, daughter of Mr. C. E. Lawless. She died some four years ago. Sir Warren was a Knight of Grace of the Order of St. John of Jerusalem, and a J.P. of the County of Cork.

chronic sick, and the public assistance committee, to whose care the able-bodied are entrusted. Institutions consisting of an infirmary together with a workhouse presented a problem of their own, because they contained, between the many chronic sick who require constant nursing attention and the many healthy aged requiring practically no care, a great mass of disability of varying degree which is extremely difficult to classify. In the strict medical sense many of the ambulant cases might be called "sick"—for example hemiplegics, sufferers from arterial or heart disease or chronic bronchitis, and many mental cases. In one institution no less than 111 out of 119 "able-bodied" inmates over 65 years of age were medically classified as sick; yet many of them were quite able to look after themselves and take part in the ordinary routine of the institution, so that from the administrative point of view they could quite fairly be classed as able-bodied.

The county council therefore decided to place all the separate infirmaries and 11 of the mixed institutions under the control of the central public health committee and to reserve 14 mixed institutions for public assistance purposes, retaining at least one institution in each public assistance area. It is hoped ultimately to transfer all the chronic sick to institutions under the public health committee, but at present the total accommodation available for them is inadequate and in some cases unsuitable. The overcrowding is largely due to the increasing popularity of infirmaries; as is well known, these institutions have completely changed their character and now treat practically the same type of case as the large voluntary hospital. The result has been a curtailment of accommodation for the chronic sick and a tendency to send them into the chronic wards of the mixed institutions. There has also been during the last 30 years a great increase in the number of aged people living in London, and the neutralising effect of the Old Age Pensions Act and other social measures has not been sufficient to prevent a considerable increase of pressure on the accommodation. A hospital of 500 beds has been opened at Sidcup and another of 320 beds at Tooting for convalescent patients, and all non-notifiable cases of infectious disease are now transferred to hospitals formerly under the control of the Metropolitan Asylums Board. It is hoped to give further relief by reorganising the district medical and nursing services, so that cases unsuitable for hospitalisation may be cared for at home. All the infirmaries have been carefully surveyed and a good deal of work has been undertaken or planned to provide new accommodation, new theatres, and new X ray and electrical departments. Arrangements have been made for the establishment of five well-equipped and adequately staffed laboratories, and it is hoped ultimately to provide an adequate pathological service for every general hospital dealing with acute cases.

A central voluntary hospitals representative committee has been formed to ensure coöperation with the voluntary hospitals, and the question of medical education in municipal hospitals and certain matters of staffing have already been discussed. The out-patient accommodation at the Maudsley Hospital for mental patients has been supplemented by the establishment of three psychiatric out-patient clinics at the Mile End, St. Charles, and St. Mary's (Islington) Hospitals; these are under the general direction of the medical superintendent of the Maudsley Hospital and each has one or more social workers. A complete survey has been made of the accommodation available for mental patients in poor-law institutions, and proposals now under consideration will lead, it is hoped, to a very notable improvement in the structural character and the staffing of this accommodation.

Three provisional surveys have also been completed in Wales—namely, at Swansea, Merthyr, and Pembroke. The position of the medical officer of health in certain instances has not been clearly defined; it appears that some officers are regarded as advisory and only deal with matters referred to them by the public assistance committee, the medical services remaining generally as under the guardians. Coördination has not yet been fully effected.

ISOLATION AND SMALL-POX HOSPITALS.

Only one scheme under Section 63 of the Act has so far been approved by the Minister; no doubt more schemes will be proffered when there has been time for consultation and planning. The report urges the advantages that large hospitals have over small ones now that rapid road transport and telephone communications are available. The advantages include considerations of economy, staffing, isolation accommodation, and laboratory and other accessory services. Where the small existing hospitals in an area are of poor construction and obviously deficient, the report recommends that they should be closed. If they are satisfactory apart from their size, they may perhaps be included in schemes, possibly by pooling the work. Although the Ministry mentioned as a useful guide the figure of one isolation bed per thousand of population, the proportion in any particular area must be estimated in relation to the age-grouping, distribution, and occupations of the population and the local circumstances. It seems probable, however, that in many districts too narrow a view has been taken of the function of the isolation hospitals; scarlet fever and diphtheria should by no means be the only diseases treated.

Small-pox should be treated in a separate institution, as there is always some risk of spread if there are a number of cases of severe small-pox in a general isolation hospital. It is suggested that small-pox hospitals can serve very large areas and that some arrangements should be made so that, in the event of a widespread outbreak, extra accommodation could be diverted temporarily to the sole use of small-pox cases.

APPOINTMENTS OF MEDICAL OFFICERS OF HEALTH.

The Act favours whole-time medical officers of health, but progress in this respect has been slow. In 1873 one-quarter of all appointments were whole-time, but in 1926 the proportion had only risen to one-third. Nevertheless, the Act does toll the knell of the part-time medical officer of health. While recognising the great debt which the community owes to these men, the Ministry holds that the increasing complexity and demands of the public health services are so insistent that the dual rôle of medical officer of health and private practitioner now contains inherent incompatibilities. During the past year 85 appointments were sanctioned by the Ministry: of these 40 were filled by part-time appointments; 18 by individual whole-time appointments; four by whole-time appointments in combination with other local sanitary authorities; and 23 by whole-time appointments in association with the county council. Since part-time officers still predominate, there must be in the future a large proportionate increase in the number of whole-time officers, and it is necessary to make sure that the development of the service under its new conditions shall be such as to induce suitable candidates to embrace a career

offering an attractive diversity of interest and a reasonable prospect of promotion. The evolution of a perfect scheme, the report concludes, is in the interests both of the public and of the members of the service, and although it must be gradual, its importance must never be forgotten.

MENTAL HOSPITALS AS THEY ARE TO-DAY.

ALL who are interested in the welfare of persons afflicted in mind, as well as all those concerned in the administration of our mental hospitals, should read the second part [1] of the report of the Board of Control recently published. It is the supplement of the report which appeared earlier this year, and was reviewed in our issue of July 11th (p. 90). The new volume may be considered as divided into three parts—that devoted to an account of research during the year 1930, a statistical summary of the movement of patients in the mental hospitals of England and Wales, and copies of the reports of visiting commissioners at all these institutions.

RESEARCH AND PATHOLOGICAL INVESTIGATION.

About one-third of the hospitals have sent in reviews of their work, and though these reports do not include by any means all the research that has been undertaken they show evidence that the problems of psychiatry are seriously studied. A summary of this was given by the commissioners in Part I. of their report, and it is abundantly clear from the details now added that in certain hospitals at any rate the clinical work is of a high order. Cases are reported at length, showing an examination of patients conducted with scrupulous care, and that novel as well as routine methods of treatment are tried in a systematic way. In many hospitals there is a strong staff of consultant physicians and surgeons, so that effective treatment is available in all departments of medicine and surgery, and it is heartening to find the extent to which patients in our public mental hospitals have the advantage of the new developments in therapeutics and the readiness of the medical officers to apply them. In original research, apart from the investigation of individual cases, much is being done, and it would be unfair to expect striking results in a single year. Among the subjects under research are the following: Colloid sulphur therapy, investigations of hepatic efficiency, malarial therapy in general paralysis, cerebro-spinal fluid examination, protein shock therapy, *Brucella abortus* infections, acidophilus milk therapy, physical constitution and type of mental disorder, anaerobic and aerobic bacteriology in relation to mental illness, gold-sol problem, nitrogen metabolism, and carbohydrate metabolism. Nevertheless, in reading the reports the thought arises whether the workers in our mental hospitals are not too isolated. The hospitals are often in remote districts, and it is not easy for medical officers to attend scientific meetings, and when the effort is made there may be little to interest the enthusiastic worker. There is reason for a suspicion that some of the work reported would have been more valuable if the pathologist had not been separated from the general stream of scientific thought. It is true that the Board of Control (see Part I., p. 12) are hoping to arrange for greater coördination of research. No doubt the genius in science works largely alone, goes his own way, and spends little time in digging up reports of work by others. But such men are scarce, and the ordinary research worker cannot afford to neglect what is done elsewhere. On the whole, the reports are encouraging in showing that hospital authorities are alive to the importance of research, and that not a few medical officers spend laborious hours in the pursuit of knowledge, for which there is little hope of credit or return.

[1] Lunacy and Mental Deficiency. Seventeenth annual report of the Board of Control for the year 1930. Part II. H.M. Stationery Office. 6*s*. 6*d*. Postage extra. This volume does not give any particulars of the mental deficiency institutions which are supervised by the Board.

RECOVERY- AND DEATH-RATES.

The statistical returns give the number of patients, admissions, discharges, and deaths, and the recovery- and death-rates in all the public mental hospitals, in the registered hospitals, and in the London and provincial licensed houses. It appears that nearly 7000 patients were discharged recovered out of an average number resident of about 124,000, and there were admitted during the year 23,000 patients. Bearing in mind the increasing number of aged infirm patients that are sent under care, and the unfavourable nature of so many others, it is satisfactory that about 7 out of every 23 patients admitted recover. In the county and borough mental hospitals in England and Wales, taken by themselves, the recovery-rate on new admissions was 33 per cent.—for males 29·5 per cent., and for females 35·5 per cent. These figures are naturally dependent on the meaning given to the word recovery. Some regard it as a return to the status quo ante, the psychosis having passed off; others as meaning the ability to resume life in the world at large; and others only consider a patient to be recovered when thoroughly sound in mind. Besides these causes of divergence, much depends on the class of patients received and the social pressure which leads to certification. Thus, it is not surprising that the recovery-rate varies greatly in different institutions. The lowest recorded is 14·6 per cent., the highest 57 per cent., whilst there are 15 out of 99 hospitals with a rate below 25 per cent. and 14 above 45 per cent. Whilst it is not safe to draw any conclusions regarding success or failure of treatment in any particular institution, the broad general fact emerges that mental hospital treatment results in an encouraging number of recoveries. We may be reminded that in the bad old days, 150 years ago, the recovery-rate was even higher than at present, but that was clearly due to the nature of admissions. A very much larger proportion of cases of acute mental excitement were admitted in those days, and in these cases the prospects of recovery are much greater than in the ordinary run of admission at the present time.

The proportion of deaths to the average daily number of patients in residence was 6·7 per cent. The highest recorded was 12 per cent., the lowest 3 per cent., and both were from hospitals in the county of York. It is interesting to note the extent to which patients are discharged from certificates although not recovered and considered of sound mind. Last year 4200 patients were so discharged. The reports do not say what became of them; but the great majority will no doubt be to the care of friends, although some may have been transferred not under certificate to public assistance institutions.

THE DAILY ROUND.

The reports of the visiting commissioners necessarily show sameness in phraseology, seeing they are constantly referring to similar matters, and that there are statutory obligations to be fulfilled. In almost all cases they express approval of the way the hospitals are administered. In no case is serious fault found,

and in not a single instance did the commissioners find anyone improperly detained. It must be remembered that the management of the public hospitals is vested in the local authority, and the Board of Control can only make recommendations for improvements. These deal frequently with overcrowding, and the urgent need in not a few hospitals for admission and convalescent blocks, so that newly admitted and those who are improving can be effectively cared for apart from the chronic patients. There are two sides to this question, for if almost all the recoverable patients are nursed apart, the remainder of the institution becomes more of an asylum than ever—merely a place of refuge for those unable to hold their own in the world at large. Conduct rather than recoverability must consequently play a large part in classification. Nevertheless the system, frequently mentioned in those reports, which places newly admitted, sensitive patients in close proximity to the noisy and degraded and chronic patients must be bad.

The increasing cultivation of handicrafts and occupations is an encouraging feature. In many hospitals specially staffed occupation centres contribute to the well-being of the patients, and some of these become the organising centre for occupation in all wards. It is pleasant, for instance, to read "in almost every ward we observed with satisfaction that patients, instead of sitting about in idleness, were encouraged, and in many instances engaged, in amusing and occupying themselves in work coming under the category of arts and crafts, the nurses, many of whom have received practical instruction, aiding and assisting them in their work"; and again, "The work done in the wards, under instructions of the ward sisters, at rug-making, fancy needlework, &c., is also worthy of note for the good it does in occupying the patients, but also as the funds obtained from sales of work can be used for amusements and other benefits to the patients." Occupation-therapy is, to an increasing extent, cultivated in our mental hospitals, and this in addition to the various trades and shops established for direct utilitarian purposes.

The commissioners frequently refer to the amount of parole given, and the extent to which leave of absence on trial is permitted. There appears to be a wide divergence of practice in these respects; in some, little freedom is permitted; in others, large sections of the hospital are administered on the open-door principle. One of the most responsible duties of the medical officer in charge is the decision whether a patient is fit for greater liberty, and this can never be shifted on to other shoulders. The impression gained on reading these reports is that the commissioners encourage a large measure of liberty. "Safety first" is a poor maxim in nearly all walks of life; in mental hospitals it can be cruel and deadening to a deplorable degree.

Much effort is directed to providing patients with books, games, entertainments, and much is done to brighten the wards and the gardens. Judging from the frequency to which reference is made to the gardens and exercise grounds used by patients, it would appear that these are often lacking in interest. Seeing that the only view of the outside world certain patients can obtain is limited to the prospect seen in and from the ward gardens, it is important these should be as attractive as possible. In some of the reports the word "airing-court" is used—an expression which suggests a limited court-yard paved with asphalt, with crowds of patients taking an airing, as in a prison-yard. We hope this picture is unjustified, for we find in several of the reports appreciative references to the ward gardens.

A great deal of information describing the conditions of life is given in these reports. We can hardly expect the printed reports to contain all the criticisms and suggestions for improvement made by the commissioners, nevertheless the general effect of their perusal gives a feeling of satisfaction that the insane are not only receiving skilled care and treatment, but that continuous effort is expended in making the lot of those who fail to recover as useful and as happy as their conditions permit.

ANNUAL REPORTS OF MEDICAL OFFICERS OF HEALTH.

THE following are 1930 statistics of one Yorkshire city and two Lancashire county boroughs:—

Name of district and estimated mid-year population.	Birth-rate.	Death-rates per 1000 of the population.					Death-rates per 1000 births.		
		All causes.	Tuberculosis.	Cancer.	Respiratory diseases with influenza.	Heart disease.	Infant and neonatal mortality.	Young child (1–5 yr.) mortality.	Maternal mortality from childbirth.
Sheffield .. (518,000)*	15·1	11·0	0·86	1·45	1·2	1·8	67/37	28	5·1
Blackburn .. (125,300)*	12·7	12·8	0·98	1·48	2·5	2·2	83/47	39	4·4
Preston .. (126,100)*	15·7	12·2	0·99	1·50	1·6	2·3	73/43	22	6·6

Registered stillbirths per 100 live births: Sheffield, 5·1; Blackburn, 6·8; Preston, 5·7.

* Registrar-General's estimate for 1929. The provisional Census (1931) figures are: Sheffield, 511,742; Blackburn, 122 695; Preston, 118,839.

Sheffield.

Dr. John Rennie is fortunate in the year for his first annual report. The general death-rate was the lowest ever recorded for the city. There was a very low mortality from epidemic disease and the death-rates from tuberculosis, pneumonia, and bronchitis, and the infant mortality-rate were also the lowest on record. The population was over-estimated to the extent of about 6000, but this does not appreciably affect the statistics. Thus the general death-rate of 11·0 will only become after correction 11·1. Sheffield also had a fairly good position among the 18 towns with populations exceeding 200,000. Thus it had the lowest rate of all for respiratory tuberculosis, and was only beaten by Croydon for all tuberculosis. Bradford was the only town with a lower birth-rate; there were three lower for general death-rate and seven lower for infant mortality-rate.

Since 1922 it has been customary to draw the attention of the medical attendant to every unnotified death from pneumonia. The cases notified and treated at home are visited by the Queen's nurses. There were 1568 notifications with 378 deaths. The percentage of cases removed for treatment to the City Fever Hospital and City General Hospital was 31·6. The male deaths from respiratory tuberculosis were 217, and the female deaths 138, whilst the deaths from other forms were 45 male and 44 female. At the end of 1930 the cases on the register numbered 6100. In the case of 1272 of these the sputum had been positive at some period. No case, which at any time has thus been found to be infectious, has so far been cancelled. The number of these positive cases notified from Jan. 1st, 1911, to Dec. 31st, 1922, was

4276, and at the end of 1930 only 253, or a percentage of 5·9, were alive. Apart from surgical tuberculosis, 3126 cases received institutional treatment during the year. Some idea of the work may be gathered from the fact that there were 1869 notifications of pulmonary tuberculosis, and that 2518 "suspects" and 3699 "contacts" were examined at the dispensary. The special scheme for rehousing families including an infectious case of tuberculosis, begun in 1928, still operates, and, at the end of 1930, 66 families were being so dealt with. The 130 beds in King Edward VII.'s Hospital for surgical tuberculosis in children are not all needed for Sheffield, owing to the stay in hospital being shortened by the discovery of the cases at an earlier stage. Paying beds are therefore available for outside authorities. Adult patients with bone and joint tuberculosis are treated in one of the city hospitals and transferred to King Edward VII. Hospital for operative treatment, being separately housed in hut-shelters and sent back to the other hospital when active surgical treatment has become unnecessary.

The transfer of the poor-law hospitals was a very simple matter, as for many years the guardians had worked in the closest cooperation with the health committee. More than half the tuberculosis beds were already in the guardians' hospitals, and the only maternity beds possessed by the health committee were in one of them. Moreover, for 20 years the poor-law hospitals had been separated from the "institutions," and had a completely separate staff. These hospitals were equipped and staffed on modern lines, and were simply transferred to the health committee, without alterations, as working units. In June, 1929, the municipal and voluntary hospitals' joint advisory committee was formed to survey the available hospital accommodation and to consider future requirements. Already, as a result, extensions have been decided upon. The four voluntary hospitals have 1092 beds and the transferred poor-law hospitals 1502. The voluntary hospitals before the transfer had long waiting-lists, while the poor-law hospitals frequently had available empty beds. The first extension decided upon was the provision of a fully equipped casualty department at the renamed City General Hospital, capable of dealing with one-third of the total casualties. The survey showed that the hospital maternity beds available numbered 91 and were inadequate. The second extension will be the provision of an extra 200 maternity beds at the City General Hospital, for which an expenditure of £20,000 has been approved. Before April 1st contributions to be paid by patients and their relatives were collected by the out-relief committee through the relieving officers; and an important change was made in June when a lady almoner was appointed with an office in the City General Hospital.

In June Dr. Margaret B. Walker was appointed assistant medical officer (maternity), and steps were taken to unify and supplement the whole of the antenatal supervision of expectant mothers. Dr. Walker's duties are divided between the central antenatal clinic and the municipal maternity hospital at Nether Edge, which provided for 579 confinement cases in 1930. Expectant mothers first attend the central antenatal clinic and those requiring hospital treatment are allocated to one or other of the hospitals. Thereafter they attend the antenatal clinic of the hospital where they are to be confined. In this way the same medical and nursing staff follows the cases through to the postnatal clinic. At the City General Hospital 560 women were confined, an increase of 152 on the previous year. There has been an antenatal clinic at this hospital for some years, but Dr. James Clark, the medical superintendent, points out that there are still far too many women who make no preparations for their approaching confinement. Thus out of the 561 women delivered during 1930 245 presented themselves for the first time when in labour. The demand for maternity beds led to the opening of an annexe to the Nether Edge Hospital with 20 additional beds in January, 1931. In addition to hospitals the health committee has taken over the scattered homes and the colony of cottage homes with their staffs. The guardians already had a separate nursery for infants under 3, so that there are now no children in the institution of the public assistance committee.

The five-year programme provides for the erection of 500 houses annually to compensate for the demolition of 22,000 houses in clearance areas and of 300 individual unfit houses, and for the erection of 7750 additional houses. At the end of the year there were about 125,000 houses in the city, of which the corporation have erected 10,000. The water-carriage system is now practically complete, but nearly 32,000 houses, including 16,000 back-to-back houses, have no separate w.c.'s. The work of providing additional water-closets, so that each house, except the back-to-back, will have its own, is proceeding very rapidly. In May, 1928, Sheffield and Rotherham formed a joint statutory smoke abatement committee. In April, 1930, this committee was extended to include all the local authorities in the district, except the Worsley Rural District Council, which it is still hoped may be induced to join. Other joint smoke committees are advisory only, and the Sheffield district committee is believed to be the only statutory body of its kind. Useful research work by the manufacturers is in progress, and the joint advisory committee, half selected from the manufacturers and half from the administrators, with Prof. C. H. Desch as chairman, has been formed to encourage research.

Sheffield consumes 0·35 of a pint of milk per head of the population per day. One-fifth of the milk is produced by 1798 cows stalled in the city, and among these Mr. W. Tweed, M.R.C.V.S., and his staff found by routine inspection and milk sampling 23 cows with tuberculous udders and 20 cows with other forms coming under the tuberculosis order. By the much less perfect system of following up tuberculous samples of imported milk 37 cows suffering from tuberculosis of the udder and giving tuberculous milk were found in the country herds, which supply four-fifths of Sheffield's milk. Mr. Tweed says the opening of the new municipal abattoir on June 7th, 1929, marked the greatest advance in the inspection of meat in the city. At the beginning of 1930 private slaughter-houses numbered 33, whilst at the end of the year there were only four in use. The value of the abattoir for meat inspection is shown by the fact that during the 19 months since it was opened the average amount of condemned meat has been almost double what it was during the 17 months before opening. Mr. Tweed thinks it may be advisable at a later date to require all meat dressed outside the city to be marked or to pass through a clearing-house. By-law 9B, for the compulsory use of mechanically operated instruments, was adopted in 1929, whereas towards the end of 1930 the Birmingham committee decided against its adoption.

Blackburn.

Dr. V. T. Thierens says the only work transferred from the guardians to the corporation under the Local Government Act is the administration of the Vaccination Acts and the supervision of children nursed out for reward. Since April 1st the public assistance committee has administered Queen's Park (late poor-law) Hospital, which has 679 beds, 20 of which are allocated to maternity, 161 to mental cases, and 145 to the chronic sick. The medical officer of the institution states that there are 35 mental cases suitable for being dealt with under the Mental Deficiency Acts. The corporation does not provide institutional accommodation for mental defectives, but there are 50 such cases at present in the Calderstones Institution. A subcommittee of the corporation has conferred with the lay and medical boards of the Blackburn and East Lancashire Royal Infirmary as to the hospital requirements of the district. The last-named hospital has accommodation for surgical tuberculosis and orthopædic

cases, and undertakes the treatment of venereal disease, and of children suffering from tonsils and adenoids, for the local authority.

The isolation hospital has 86 beds, including 30 used for tuberculosis, and is being extended at present by the addition of four single-bed cubicles. All cases admitted to the hospital are placed in barrier isolation, and those which have been in contact with a second infectious disease are nursed in barrier isolation until the incubation period has elapsed. This procedure has reduced the incidence of cross-infection. Except in epidemic periods, most of the scarlet fever cases are hospitalised, and Dr. Thierens thinks that some of the beds allocated to scarlet fever could be more advantageously used for measles, whooping-cough, and acute rheumatism. Antitoxin is administered to all scarlet fever cases admitted, and the average stay in hospital was 30 days. The diphtheria cases admitted to hospital numbered 125, including some from outside the borough, and only one of the ten fatal cases had received antitoxin before admission to hospital. One case of *Brucella abortus* infection came to notice, a male of 22 years, employed in an outlying dairy farm at which two cases of cattle abortion had occurred shortly before the patient sickened. The illness lasted six weeks, and ended in recovery. A specimen of blood was found to agglutinate *B. abortus* (Bang) in a titre of 1 in 2560. Two cases of psittacosis were admitted to hospital in February. One was fatal, and the other recovered. The nature of the disease was confirmed by Dr. Bedson, of the London Hospital, who inoculated budgerigars with specimens from the organs of the fatal case. The two cases were infected by a parrot purchased 14 days before the onset of the disease. The bird was ill on delivery, and died two days later.

The new census indicates that the population is about 4000 less than in 1921, whereas inhabited houses are about 3000 more than in 1921. There is a shortage of houses, however, at reasonable rents, and families are living under overcrowded conditions through financial inability to secure better accommodation. The register of houses let in lodgings contains 91 houses with 490 rooms and over 1000 occupants. As instances of exorbitant profits—one house rated at £52 per annum is let in rooms at an aggregate yearly rental of £380, and another rated at £19 gives a gross yearly return of £180. During 1930, 190 houses were built by the corporation, and another 134 were in course of erection at the end of the year.

Preston.

Dr. F. A. Sharpe states that, in addition to vaccination and the supervision of children nursed out for reward transferred automatically, the council has made declarations under the Local Government Act, 1929, to provide (otherwise than by way of poor relief) for domiciliary assistance to the blind, for the treatment of all cases of tuberculosis, and for the education of all children. The Preston Institution is situated in the administrative county. Its hospital, now to be known as the Sharoe Green Hospital, is separate from the rest of the institution, has 246 beds, and includes maternity wards and a wing for mentally deficient women, and many beds are occupied by aged persons or those suffering from chronic diseases. The question of its appropriation by the health committee has been under consideration, and, in the event of its being so appropriated, further consultations will take place with the management of the Preston Royal Infirmary, so that all the institutional medical needs of the community may be arranged to the best advantage.

The new census shows that the population is only about 1400 more than in 1921, and a table shows that, since 1921, 1822 houses have been built by the council and 1931 by private enterprise. Inquiries provide no evidence of gross overcrowding. Dr. Sharpe says the crew quarters of the British vessels arriving in Preston are far from satisfactory as regards cubic space, ventilation, lighting, &c., and that the Scandinavian ships, on the other hand, are as a rule well-designed and form a marked contrast. Action by the Board of Trade, he says, is urgently needed in this matter. Major Finch, F.R.C.V.S., says the essential feature of the tuberculosis order is notification by the owner, but that in practice this seldom occurs. Only 167 cows are stalled in the borough, and among these no case of tuberculosis was discovered during the year. During the last eight years 7·8 per cent. of the outside milk sampled has been infected with tubercle and the results of following-up are anything but satisfactory. Of the 29 positive samples notified to the county council during 1930 the results of 23 have come to hand. Six cases of tubercle of the udder were discovered, two of the cows being in an advanced state of the disease. In ten investigations no signs of the disease were found. In eight herds further milk samples were found to be positive, and later investigations traced the disease to individual cows. In seven cases the source of the original contamination was not found. Major Finch urges that the order could be made effective if uniform sampling and inspection were carried out over the whole country and failure to notify were followed by legal action.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED SEPT. 5TH, 1931.

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 63 (last week 33); scarlet fever, 1404; diphtheria, 826; enteric fever, 51; pneumonia, 473; puerperal fever, 48; puerperal pyrexia, 105; cerebro-spinal fever, 31; acute poliomyelitis, 11; encephalitis lethargica, 9; dysentery, 7; ophthalmia neonatorum, 91. No case of cholera, plague, or typhus fever was notified during the week.

Notifications of small-pox were received from the following nine counties: London, 9 (Bethnal Green 3, Camberwell 3, Hackney 1, Poplar 2); Derby, 10 (Alfreton); Durham, 1 (Whickham); Essex, 13 (West Ham 6, Leyton 4, Walthamstow 1, Billericay 2); Leicester, 14 (Leicester C.B. 9, Wigston Magna 1, Barrow-upon-Soar 1, Melton Mowbray 3); Lincoln, 1 (Cleethorpes); Middlesex, 1 (Edmonton); Yorks., West Riding, 11 (Darton); Glamorgan, 3 (Pontypridd).

The number of cases in the Infectious Hospitals of the London County Council on Sept. 8th–9th was as follows: Small-pox, 39 under treatment, 5 under observation (last week 33 and 2 respectively); scarlet fever, 1044; diphtheria, 1329; enteric fever, 17; measles, 116; whooping-cough, 1044; puerperal fever, 18 (plus 13 babies); encephalitis lethargica, 215; poliomyelitis, 8; "other diseases," 84. At St. Margaret's Hospital there were 13 babies (plus 8 mothers) with ophthalmia neonatorum.

Deaths.—In the aggregate of great towns, including London, there was no death from small-pox or enteric fever, 13 (5) from measles, 4 (2) from scarlet fever, 24 (7) from whooping-cough, 19 (4) from diphtheria, 49 (3) from diarrhœa and enteritis under two years, and 10 (0) from influenza. The figures in parentheses are those for London itself.

Bradford reported 2 deaths from measles; Birmingham, Liverpool, and Sheffield each 2 from whooping-cough. Four fatal cases of diphtheria occurred at Leeds, 3 at Hull, and 2 at Derby. Diarrhœa was credited with 6 deaths each at Birmingham and Liverpool, 4 each at Manchester, Bradford, Leeds, and Hull, 3 at South Shields.

The number of stillbirths notified during the week was 238 (corresponding to a rate of 39 per 1000 births), including 32 in London.

BIRMINGHAM HOSPITAL COSTS.—It is officially stated that in 1919 the weekly cost per in-patient at the General Hospital was £2 18*s.* 7*d.*; in 1930 it was £3 14*s.* 4*d.* At the Queen's Hospital the cost has fallen from 11*s.* 2*d.* per day in 1920 to between 8*s.* 3*d.* and 8*s.* 8*d.* from 1924 to the present time. At the Children's Hospital the cost in 1930 was £2 16*s.* 4*d.*, as compared with £3 7*s.* 1*d.* in 1923. At the Eye Hospital the cost has been brought down from £3 3*s.* in 1920 to £2 12*s.* 6*d.* last year.

CORRESPONDENCE

ALUMINIUM AND HEALTH.

To the Editor of THE LANCET.

SIR,—Your leading article last week (p. 595) will be welcomed by many readers. I entirely agree with the statements made as to the harmlessness and innocuousness of this modern non-ferrous metal on the human frame. From comparative analyses it would appear that aluminium contains fewer impurities of a possibly deleterious nature than any other metal in domestic use. During the past twenty years I have had many hundreds of workers in aluminium in large factories under my care. During this time I have had no evidence whatever of any industrial disease (such as is to be found in some other metal industries) resulting from the ingredients which are used in the manufacture of aluminium ingots.

The pure bauxite clay and cryolite used in the manufacture of the metal are of the highest purity. The former is carefully calcined and much of the fine alumina dust and hot furnace fumes must be inhaled or swallowed by the workers in the factories. Yet I have never observed the slightest signs of ill-health, temporary or chronic, which could be attributed to the inhalation of alumina. Numerous workers who have spent the greater part of their working lives, some for thirty years, are in excellent health, and show no sign of nervous depression. The health of their dependants resident in the immediate vicinity is exceptionally good. Large families are the rule. For example, one busy aluminium industrial centre has a population of 1400, including 470 thriving children.

In my own household aluminium cooking and infusing utensils are appreciated on account of their lightness, cleanliness, and easy transmission of heat. If cleaning is done by wire abrasion with a trace of soap the same articles can be kept smooth, clean, bright, and spotless for years. With a cooking surface kept perfectly smooth and free from cracks, there is much less chance of particles of organic matter being left to decompose in the pans. Another helpful point in the use of aluminium vessels is that, when bringing certain foods to the boil, they are hardly ever singed.

Alumina in the shape of pure clay has of course been given in considerable quantities in certain diseases without poisonous results. As you say, aluminium appears to be mostly eliminated by the intestinal route, and does not enter the vascular channels.—I am, Sir, yours faithfully,

LACHLAN GRANT.

Bacteriological Laboratory, Ballachulish, Argyllshire, Sept. 14th, 1931.

DUCK EGG POISONING.

To the Editor of THE LANCET.

SIR,—A case was recently recorded in the press of a man who had died as a result of eating cake made with duck eggs. The man's wife who had also partaken of the cake became seriously ill but recovered. W. M. Scott[1] describes the occurrence of a case of acute gastro-enteritis due to salmonella. In his case the patient ate a portion of cream which had been prepared for a trifle by whipping the white of duck eggs. It has been established that bacterial infection of the egg albumin does occasionally occur, and the infecting organism is often *B. aertrycke* in duck eggs laid in and around infected ponds. The most likely mode of infection according to A. Lecoq who wrote a monograph on the subject published in Paris in 1906 is that the infected material is introduced into the oviduct of the hen or duck during copulation. The infection has been found to occur in the albumin as it is deposited around the yolk. He actually found small seeds, stones, and pieces of sticks embedded in eggs and introduced in this manner. Spencer Low thought that infection of the ovary, oviduct, and egg with salmonella could take place as part of a generalised infection of the blood. It has been found that if eggs are kept dipped in cultures of *B. aertrycke* they may become infected in a few days. As the eggs become staler, the salmonella multiply rapidly, and a portion of a stale egg would represent a truly enormous dose of the infection. Curiously enough such an egg may appear to the sense of smell as no more than slightly stale and not unsuitable for making custards or cream. When the eggs are not thoroughly cooked, or where they are merely whipped, as for a cream or a custard or an ice-cream, the danger is apparent.

In a case under my own observation the preliminary symptoms resembled an attack of migraine. There was some visual disturbance followed by the familiar hemicrania localised to the left frontal region. The hemicrania gave place to a sensation of pins and needles on one side of the body; great muscular weakness supervened, and the patient was quite unable to walk unaided. He had some facial paralysis, and a complete disorientation as to place and time. The patient became apprehensive with a fear of impending death, and he had a rigor. It is difficult to understand why in a meal consumed by many people, the patient was the only sufferer. It may be that the portion of cream allotted to the patient alone contained the specific poison. After he had been put to bed with hot bottles he had violent pains in the head, alternating with bouts of vomiting, for some time. The toxic substance was doubtless eliminated through the vomiting and this natural process suggests that the best treatment of such cases is probably gastric lavage.—I am, Sir, yours faithfully,

London, Sept. 14th, 1931. C. HORWITZ.

[1] Brit. Med. Jour., 1930, ii., 56.

MECHANISM OF PULMONARY COLLAPSE.

To the Editor of THE LANCET.

SIR,—I am extremely interested in Sir Charlton Briscoe's theory of the mechanism of massive collapse of the lung. Since, however, neither marked cyanosis nor gross mediastinal shift are normally associated with either simple pulmonary deflation or simple pleurisy, it would be helpful in considering this theory to know how he would explain these concomitants of the condition.

I am, Sir, yours faithfully,

C. O. S. BLYTH BROOKE,
Chief Tuberculosis Medical Officer,
Belfast, Sept. 13th, 1931. Antrim County Council.

To the Editor of THE LANCET.

SIR,—I yield to no one in my admiration for the enthusiasm of, and the work done by, Sir Charlton Briscoe in relation to the mechanism of lung inflation. I find it difficult, however, to follow his new theory

Continued at foot of next page.)

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS.

THE FINANCIAL CRISIS.

REASSEMBLY OF PARLIAMENT.

BOTH Houses of Parliament reassembled on Tuesday, Sept. 8th, for a special session to deal with the economic and financial crisis which has arisen since the adjournment for the summer recess on July 31st. The Prime Minister (Mr. Ramsay MacDonald), in the House of Commons, and Lord Reading (Secretary of State for Foreign Affairs), in the House of Lords, explained the reasons for the resignation of the Labour Government and the setting up of a national administration to balance the Budget and to restore confidence in British credit at home and abroad. The new Government was opposed in the Commons by the greater part of the Labour Party, under the new leadership of Mr. Arthur Henderson, but some Labour members decided to defy the General Council of the Trades Union Congress and to support the Prime Minister, Mr. Snowden, and Mr. J. H. Thomas in the line they have taken in joining the new Government and insisting upon a drastic policy of cuts in national expenditure, including certain social and other national services, and relief payments to unemployed persons. After a long debate a division which was taken on Tuesday night in the House of Commons resulted in a vote of confidence for the National Government by 309 votes to 249, a majority of 60.

THE SUPPLEMENTARY BUDGET.

On Thursday, Sept. 10th, the House of Commons went into Committee of Ways and Means, Sir DENNIS HERBERT, chairman of committee, in the chair.

Mr. SNOWDEN (Chancellor of the Exchequer) made his Supplementary Budget statement. He said that he was discharging one of the most disagreeable tasks that had ever fallen to his lot. It was no pleasure to call upon people to make sacrifices or to bear additional burdens, and only a consciousness that those sacrifices and burdens were necessary to avert far greater sacrifices and burdens made his task that day tolerable. It was undoubtedly a fact that nationally we had for some time past been living beyond our means, and living to a considerable extent upon our capital. The trade depression of the past ten years had reduced the yield of taxes, and at the same time had increased expenditure. Seven years ago the Unemployment Fund was paying its way. It was paying off debt. This year it was costing the Exchequer about £100,000,000. He could only meet the present situation by reducing expenditure or by increasing taxation, or by a combination of both. The nation had been under the delusion during the last few years that in these times of unparalleled depression it could maintain the expenditure of more prosperous times. Our total national and local taxation was now very near one-third of the total national income. The Government had decided that borrowing for the Unemployment Fund and the Road Fund must cease, and this decision must apply to the current financial year. There would be a loss of revenue this year from taxes of £29,000,000; from reparations under the Hoover Plan there would be a loss of revenue of £30,300,000, or a total of £59,300,000. There would have to be supplementary estimates of £813,000, and the cessation of borrowing for unemployment and the Road Fund would account for £34,000,000, or a total of just over £94,000,000. They were saving about £13,500,000 in interest on the American debt, and £5,750,000 on the Sinking Fund on that debt. These two figures amounted to £19,300,000, which, deducted from £94,000,000, gave an estimated deficit on this year's Budget of £74,700,000. It was estimated that the deficit on next year's Budget would rise to the appalling figure of £170,000,000.

Nine-tenths of the economies which the present Government proposed to make in national expenditure were approved by the late Government. The saving which these economies would effect on this year's Budget was estimated at £22,000,000 towards the £74,000,000. The charge against revenue for debt redemption was to be reduced by £13,700,000 this year and by £20,000,000 next year. To balance the Budget he would require to impose additional taxation to yield £39,000,000 for the current year, and £80,000,000 for next year. He proposed to raise the standard rate of income-tax by 6*d.*, making it 5*s.* in the pound. Concurrently he proposed to revise the various personal and other allowances which determined the scope and graduation of the tax. Personal allowances to single persons would be reduced from £135 to £100, and to married persons from £225 to £150. The children's allowance would be reduced from £60 to £50 for the first child, and from £50 to £40 for each subsequent child. Housekeeper allowance would be reduced to £50. Deduction of tax under Section 40 (2) of the Finance Act, 1927, as amended by Section 10 of the Finance Act, 1930, would be altered to a deduction of tax at half the standard rate on an amount of income not exceeding £175. Sur-tax payable under Section 6 of the Finance Act, 1931, would be increased by 10 per cent. The tax on beer would be raised 1*d.* per pint, and on tobacco 8*d.* per lb. The petrol tax would be raised by 2*d.* per gallon. As from Nov. 9th, the entertainment tax would be raised to 1*d.* in every 6*d.*, and extended down to sixpenny admission. The Finance Bill, Mr. Snowden said, would include clauses to facilitate the conversion of the 5 per cent. War Loan to a lower rate of interest. Such conversion would be proceeded with at the first suitable moment.

On resuming his seat Mr. Snowden was loudly cheered by Ministerial supporters. Members, including Mr. Snowden's colleagues in the new Government, rose from their seats and joined in the demonstration. The Opposition remained seated, and hurled taunts and jeers across the floor at Mr. Snowden.

Mr. GRAHAM, who was the President of the Board of Trade in the late Government, was the chief speaker for the Opposition. He said that he thought that there were abundant reasons under existing conditions for abrogating altogether the Sinking Fund for the time being. Even in these difficult times he believed the Budget could be balanced without an attack upon the rates of unemployment benefit, or upon education. The Opposition would fight on that issue in the detailed discussion in Committee. He recognised that vast new burdens were being imposed

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(*Continued from opposite page.*)

of the causation of lung collapse for the following practical reasons:

(1) In the case of the average (eight out of ten) female patient, the excursion of the diaphragm in the erect posture is very slight, so limited, indeed, as to make the young radiologist describe the act of inspiration as "mainly thoracic." In the supine posture the same woman will use the diaphragm freely.

(2) After phrenic avulsion there is no lessening in the transillumination of the base of the involved lung.

I look to Sir Charlton to clear up these difficulties, as he has already solved many for myself. For the present I think the theory of temporary blocking of a bronchus, with which we are all familiar, must take pride of place.

I am, Sir, yours faithfully,

London, W., Sept. 14th, 1931. STANLEY MELVILLE.

upon the community, but the principle of equality of sacrifice which the Prime Minister had laid down was not being carried out.

The debate on the Budget resolutions was adjourned.

THE ECONOMY BILL.

On Friday, Sept. 11th, the Prime Minister moved the second reading of the Economy Bill in the House of Commons. He said that if the economy measures which had to be enforced immediately were to be discussed at length in Parliament their efficacy would be lost. The Government would fail in their duty if they did not act swiftly and stop the cracks through which the nation's resources had been flowing unnecessarily. This Bill, therefore, laid down procedure which was as drastic as the proposals it contained. It was proposed that certain action should be taken by Orders in Council which could be issued by the Government up to one month after the passing of the Bill. The Orders in Council were limited in their operation. In regard to the Ministry of Health there would be proposed a certain re-adjustment of funds, not to diminish the efficiency of the services, but to deal with certain other funds that were going in directions which, in the opinion of the Government, were not very profitable from the point of view of health insurance. Powers would be taken by Orders in Council to transfer those funds. The only fund that appeared to be affected was the Pensions Fund. This Fund had to be revised in 1924, and the effect of the Government's proposal that certain employers' contributions should be transferred from that fund to certain general expenses of the National Health Insurance would mean that the re-examination would be made two years earlier. That was the only substantial change that was proposed in the working of that economy. The Bill would enable increased contributions to be made to the Unemployment Fund, and certain contracts to be readjusted and revised. The Government's scheme worked out as follows: £70,000,000 was to be found by economies, and £80,000,000 by taxation.

OPPOSITION AMENDMENT.

Mr. CLYNES, who was Home Secretary in the late Government, was the chief speaker for the Opposition. He moved:—

"This House, whilst recognising the necessity for preserving the country's finances on a sound basis, cannot accept proposals which will deprive masses of the people of necessities of life whilst others remain in the enjoyment of luxuries, and will aggravate unemployment by restricting the purchasing power of wage-earners; nor can this House approve the second reading of a Bill abrogating Parliamentary control by authorising the making of Orders in Council designed to supersede existing Acts of Parliament or reverse settled national policy without the previous specific assent of the House of Commons."

He said that in regard to the cuts in the health services the view of the Opposition was that a lower standard of efficiency could not be for the industrial or social well-being of the country. A contract between the Government and monied interests was sacred, but in the lightest and most airy way the Prime Minister would vary or break a contract between the State and its citizens; men in various public services had secured conditions of remuneration and service which were now to be varied by Orders in Council. Many of these men had helped to save the country during the war. They would now be subject to the secret decisions of the smallest Cabinet of modern times. They could not have real economy by reducing the buying power of the people, and very shortly these substantial reductions would be reflected in ever-increasing unemployment, as well as in deepening distress among the more needy section of the public.

After further discussion the debate on the second reading of the Bill was adjourned.

SUMMARY OF PROPOSALS.

The Government's economy proposals include cuts in expenditure on education amounting to £10,300,000; on university grants to £150,000; and on health services to £1,250,000—or £11,700,000 out of the total economies of £70,000,000. The cuts in health services include a reduction in the remuneration of national health insurance doctors of one-ninth on the present rate of 9s. per year for each insured person. This reduction will take place from Oct. 1st, 1931. A similar percentage reduction is to be made from the same date from the remuneration paid to national health insurance chemists.

ADJOURNED DEBATE.

On Monday, Sept. 14th, the debate on the second reading of the Economy Bill was resumed in the House of Commons.

Mr. ARTHUR GREENWOOD (who was Minister of Health in the late Government) supported the amendment moved by Mr. Clynes on Friday, Sept. 11th. He said that the real difference between the late Government and the present Government was that the former were prepared to consider all possible proposals, however drastic, if they would achieve true equality of sacrifice. The present Government seemed to have swallowed the May Report holus-bolus, including the cuts in the rate of unemployment benefit, and had not given the country that equality of sacrifice of which some hon. Members were so fond of talking. That really was the breaking-point. He thought that the House ought to know before this Bill was given a second reading what the proposed slowing down would mean. In regard to the cut in education expenditure, was there, for example, to be a restriction of the school medical service? Was it intended to slow down the building of working-class houses, and did the Government intend to adopt that part of the May Report which suggested a reduction in the housing subsidy next April? Further, was the prolongation of the Insurance Act to go by the board before the end of the year? Was the rapidly developing maternity service, which had shown some considerable growth during the past 12 months, to come within the slowing-down process? This Bill might be the price which had to be paid to those who controlled society to-day. Noble efforts were made by hon. gentlemen opposite to do their best in the circumstances, but it appeared inevitable that in those circumstances this Bill was the price that the country had to pay to be rescued from the difficulties of the immediate crisis. But a sense of injustice was growing in the country as a consequence of this being the one method by which they must deal with the situation. While there might have been an immediate victory for existing economic and financial forces, he believed that this Bill, and the subsequent actions of the present Government, would strengthen a movement which would gain enormously in new adherents.

Sir HERBERT SAMUEL (Home Secretary) said that those who represented the Liberal party and Liberal principles and ideals felt a profound regret that their policy of national development, on which their hearts were set, was necessarily subjected to some check. But they were under the hard compulsion of financial and economic necessity, owing to the lack of resources in the nation as a whole, to carry through the measures which were found to be necessary under the circumstances. Of that necessity they were absolutely convinced. It was for that reason that many of them, who for 40 years had taken an active part in the work of social reform, now found themselves compelled, by the action of their own hands, to injure the very causes in which they passionately believed. Just as an army knew that it needed generalship, so democracy knew full well that it needed leadership, and he did not think that anything in recent weeks had met with more complete and popular approval than the formation of a small Cabinet and the swiftness of its action. Nothing would be more profoundly disapproved than the spectacle of Parliament engaging in weeks and months of debate while the financial and economic position of the nation deteriorated week by week and month by month. All successful democracies

had been ready in a time of emergency to curtail their own liberties, and even the powers of their representative assemblies. Sir H. Samuel proceeded to give an account, from notes which he had made at the time, of the conferences between the Liberal and Conservative leaders and a subcommittee of the late Government during the crisis in August. He gave details of the figures which were communicated to the party leaders as to the economies which the late Cabinet would be prepared to carry out, and stated that, except in the section relating to unemployment, the items in the White Paper produced by the present Government were, with very small differences, item for item exactly the items that were communicated to them on behalf of the late Government as those regarded by the late Cabinet as proper economies if economies had to be made along those lines. The conclusion which the House must draw was that if the right hon. gentlemen, who now formed part of the Opposition, had remained in office and had had the responsibility for dealing with the situation, and if all their complete proposals had been accepted with regard to unemployment benefit, direct taxation, and so forth, this was the very list of economies which they would have proposed.

After further discussion,

Mr. CHAMBERLAIN (Minister of Health), in winding up the debate on behalf of the Government, said that the amendment asked the House to reject the Bill on two grounds. First, on the ground of the alleged unfairness of its provisions, and, secondly, on the ground of the method of its procedure. The procedure adopted in this Bill was not without precedent. In the opening days of the Great War an Act was passed authorising the making of Orders in Council for public safety and the defence of the realm; this Bill had precisely the same purpose. In spite of the doubts of some members of the Opposition, it could not be seriously contested that a crisis did exist, and a very serious crisis. They found themselves in this position: that to-day instead of the Government being in the dock it was the members of the Labour Party. What had been clearly established was this, first, that the late Government accepted economies amounting to £56,000,000, and, secondly, that those £56,000,000 included every single one of the proposals which were before the House that day, except the 10 per cent. cut in unemployment benefit. What, then, was the use of the Opposition pretending that they did not know what was included in the cut which was to take place? Everyone admitted that these proposals must have an immediate effect on increasing unemployment, but to complete the programme they needed a constructive programme to stimulate the progress of industry and agriculture. The country could not long await that constructive programme. The sooner that Parliament concluded this business the sooner the Government or its successors would be able to begin on the work of building up.

SECOND READING CARRIED.

The Bill was read a second time by 310 to 253—Government majority 57.

HOUSE OF COMMONS.

MONDAY, SEPT. 14TH.

Stamp Duty on Patent Medicines.

Mr. MILLS asked the Chancellor of the Exchequer if he was aware that thermogene, antiphlogistine, and many other patent medicines were now being sent to qualified chemists without revenue stamps of 3*d.* and 6*d.* attached; and whether, as chemists were suffering from this recent policy, he would consider what steps should be taken to protect the revenue.—Mr. SNOWDEN replied: The law provides for exemption from medicine stamp duty in favour of "known, admitted, and approved" remedies when sold under certain conditions by duly qualified chemists or druggists. I am aware that certain manufacturers have taken steps to bring their preparations within the scope of that exemption, but this is not a matter in which I can interfere.

Narcotics Convention.

Lieut.-Colonel FREMANTLE asked the Under Secretary for Foreign Affairs whether British ratification of the 1931 Narcotics Limitation Convention had yet been decided upon; and, if not, when was a decision regarding ratification likely to be made.—Captain EDEN replied: I am informed that legislation amending the Dangerous Drugs Acts in certain respects will be necessary before the Convention for the Limitation of the Manufacture of Narcotic Drugs can be ratified. The matter is under consideration.

Headlights on Motor-cars.

Mr. DAY asked the Minister of Transport when he proposed to make regulations for the purpose of regulating the use of powerful headlights on motor vehicles.—Mr. PYBUS replied: My predecessor circulated draft regulations on this subject to motoring organisations, and to other organisations interested, and also to the press. The comments received in consequence are at present under consideration in my department. I am not yet in a position to make any statement as to the final form of the regulations.

Panel Practitioners' Remuneration.

Mr. RHYS DAVIES asked the Minister of Health if he would show in tabular form, annually in each case, the number of medical practitioners acting as panel doctors under the National Health Insurance scheme since it came into operation; the total amount paid to such panel doctors; the number of doctors receiving payment in this connexion; the number of insured persons; and the capita grant per insured person paid.—Mr. CHAMBERLAIN replied: The figures are as follows:—

Year.	Insurance doctors.	Total payments to insurance doctors.	Number of insured persons.	Capitation fee.
		£		
1913	12,674	3,858,000	11,521,772	7*s.* 6*d.* (on average).
1914	12,868	3,673,000	12,425,421	
1915	12,675	3,470,000	10,116,920	
1916	12,321	3,353,000	10,333,003	
1917	11,984	3,845,000	10,622,562	
1918	11,675	3,641,000	10,679,901	
1919	11,346	4,052,000	11,454,616	
1920	11,620	7,403,000	12,931,763	11*s.* 0*d.*
1921	12,216	7,824,000	13,225,000	
1922	12,531	6,773,000	13,275,000	9*s.* 6*d.*
1923	12,862	6,670,000	13,295,000	
1924	13,211	6,476,000	13,672,000	9*s.* 0*d.*
1925	13,823	6,518,000	13,695,000	
1926	14,432	6,661,000	14,102,000	
1927	14,952	6,831,000	14,363,000	
1928	15,269	7,037,000	14,814,000	
1929	15,563	7,109,000	14,959,000	
1930	15,750	7,300,000	15,398,000	

TUESDAY, SEPT. 15TH.

Ambulances in Irish Free State.

Mr. ROSS asked the Secretary of State for Dominion Affairs whether he was aware that, by a recent enactment of the Irish Free State, fire-engines and ambulances from Northern Ireland were prevented from going to the assistance of persons obliged to live in that Dominion, even where such assistance could not otherwise be provided; and whether he would make representations to the Government of the Dominion as to this situation.—Mr. MALCOLM MACDONALD (Under Secretary of State for Dominion Affairs) replied: The matter in question is entirely one for His Majesty's Government in the Irish Free State. I understand that no restrictions are imposed upon fire-engines and ambulances entering the Irish Free State from Northern Ireland when need arises.

BETHLEM HOSPITAL: ANNUAL REPORT.—The annual statement of accounts shows that the ordinary income for the year exceeded expenditure by nearly £3000. The cost of furniture, &c., for the new hospital at Monks Orchard has been charged to extraordinary expenditure, with the result that there was a debit balance of more than £9000. The accommodation is for 250 patients, and at present 160 have been admitted. Progress has been made in the science and treatment laboratories. Dr. Alastair McGregor has been appointed director of physiotherapy and Dr. William Brown director of the psychological department. The research department, under the direction of Dr. Lovell, the hospital pathologist, is widening its scope, and sister hospitals have been informed of the willingness of the governors to consider applications for affiliation to the hospital for the purpose of research and for the undertaking of analytical work.

MEDICAL NEWS

University of London: Lectures in Pathology.

The following lectures will be given on Tuesdays, at 5.15 P.M., at University College Hospital Medical School, Gower-street, W.C.: Oct. 13th and 20th, Prof. J. C. G. Ledingham, F.R.S., on Resistance to Infection, natural and induced. Oct. 27th and Nov. 3rd, Prof. C. R. Harington, F.R.S., on the Chemistry and Functions of the Thyroid Gland. Nov. 10th and 17th, Miss Harriette Chick, D.Sc., on Vitamins and Disease. Nov. 24th, Dec. 1st and 8th, Dr. R. T. Grant, on the Pathology of Endocarditis. Admission is free to medical students and graduates.

University College Hospital Medical School.

The annual post-graduate demonstrations arranged for the benefit of old students will take place on Oct. 15th and 16th. Among the subjects dealt with will be: Diet in Gastric Ulcer, Perineal Tears, Chronic Chest Ailments in Young Children, Recent Changes in the Treatment of Diabetes, Skiagenic Tuberculosis of the Lungs, and Acute Arsenical Poisoning.

The annual dinner of old students will be held at the Hotel Victoria, London, W.C., at 7.30 P.M. on Oct. 16th, and the annual dinner of past and present women students of University College Hospital will be held at the same time at the Piccadilly Hotel.

St. George's Hospital Medical School.

Lord Ponsonby will present the prizes and deliver the inaugural address at 3 P.M. on Oct. 1st in the Board Room of St. George's Hospital. The annual dinner of the Medical School will take place at the Hyde Park Hotel, Knightsbridge, London, S.W., at 7.45 P.M. on the same day.

As a result of the annual examination, the following *Entrance Scholarships and Exhibitions* have been awarded: J. A. Lewis, the William Brown Senior Exhibition of £120; Morvyn Williams, the William Brown Junior Exhibition of £80; F. R. Berridge and R. D. Holloway, an Anne Selina Fernee Scholarship of £80 each; A. N. F. Critchley and R. A. Binning, an Anne Selina Fernee Exhibition of £60 each; C. E. Elliott, the Devitt-Pendlebury Scholarship of £50, and S. Ginsburg an Entrance Exhibition of £40.

King's College Hospital Medical School.

The opening of the winter session will take place at the Medical School, Denmark-hill, S.E., on Oct. 1st, at 2.15 P.M. The introductory address will be given by Prof. H. R. Dean, Professor of Pathology in the University of Cambridge. Mr. A. D. Power, vice-chairman of the committee of management of King's College Hospital, will preside. The annual dinner of past and present students will be held the same evening at 7.30 P.M. at the Connaught Rooms, Mr. L. Vernon Cargill presiding.

A series of post-graduate lectures, free to all medical practitioners, will be delivered in the lecture theatre of the Medical School on Thursdays at 9 P.M. from Oct. 8th to Dec. 17th inclusive, and from Jan. 7th to March 17th. The opening lecture will be delivered by Sir StClair Thomson on Cancer of the Larynx. Subsequent lectures will be announced weekly in our Medical Diary.

St. Mary's Hospital Post-graduate Course.

The annual week-end post-graduate course, open to all medical practitioners without fee, will be held from Oct. 2nd to Oct. 4th inclusive in the library of the Medical School. The subjects to be discussed include the treatment of common fractures, rheumatoid arthritis, chronic cough, chronic indigestion, colitis, and slow labour. Other lecturers will deal with diseases of the tongue, prenatal care, surgical operations in old people, toxæmias of pregnancy, common disabilities of the foot, new methods of genito-urinary surgery, fever without signs, the treatment of chronic cough.

National Council for Mental Hygiene.

A series of lecture-discussions will be delivered in the lecture room of the Medical Society of London, 11, Chandos-street, Cavendish-square, W., on Thursdays, at 5.15 P.M., on Oct. 22nd, 29th, Nov. 12th, 19th, 26th, and Dec. 10th. The subjects will be the Prevention and Treatment of Nervous Breakdown, Sex Education, Crime and Punishment, the Mind of a Child, Marriage and Parenthood, and Psycho-analysis. The lectures will be delivered respectively by Dr. A. Helen Boyle, Dr. Israel Feldman, Dr. Letitia Fairfield, Dr. William Moodie, Dr. Doris M. Odlum, and Dr. Ernest Jones. Further particulars can be obtained from the secretary of the council at 78, Chandos House, Palmer-street, London, S.W. 1.

Surgical Instrument Manufacturers' Association.

The annual dinner of this association will take place at the Holborn Restaurant, London, on Friday, Oct. 9th, when Mr. T. P. Dunhill, assistant surgeon to St. Bartholomew's Hospital, and Mr. A. R. Melhuish, President of the Pharmaceutical Society, will be present as guests.

Public Health and the Gas Industry.

A discussion on this subject will be held at 10.15 A.M. on Sept. 29th at the Rougemont Hotel, Exeter, in connexion with the conference of the British Commercial Gas Association. The discussion will be opened by Dr. Meredith Davies, and will be followed by one on gas as a source of radiant energy for treatment of disease, to be opened by Sir Leonard Hill, F.R.S.

North Middlesex County Hospital, Edmonton.

The new radiological pavilion will be opened by Mr. George Marlow Reed, chairman of the Middlesex County Council, at 3 P.M. on Sept. 29th, and the nurses' home extension will be opened by Mrs. Marlow Reed at 3.30 P.M.

Reopening of Tenbury Hospital.

This hospital, which was closed two years ago owing to lack of support, has now been reopened. It is to be run in conjunction with the District Nursing Association.

Westbury Cottage Hospital.

This Wiltshire hospital has been rebuilt at a cost of £11,000, and the Duchess of Beaufort formally opened it last week. The cost per bed, including furnishing and equipment, was £550.

Nelson Hospital, Merton.

An extension of this hospital at Merton, Surrey, has recently been opened. It includes maternity and antenatal departments, with accommodation for 21 patients, who will pay according to their means. The extensions, reconstructions, and equipment have cost £45,000.

Maternity Home at Craigmonie.

Lady Bertha Dawkins recently opened new buildings at the Ida Merry Maternity Home at Craigmonie, Inverness, which contains ten beds, with nursery and isolation wards. The original home was established some years ago by the Hon. Mrs. Merry, of Belladrum.

A Debt-free Hospital.

Countess Fitzwilliam recently opened a new out-patients' department at Rotherham Hospital which has cost £22,500. The whole of the money has been provided, and the hospital itself is out of debt. The new building includes departments for massage, casualties, sunlight, dentistry, ear, nose, and throat treatment.

Northampton Isolation Hospital.

At a cost of about £5000 much enlarged provision has been made for the service of this hospital at Kingsthorpe. Many bedrooms and other accommodation for the staff have been provided, and the additions were opened last week by the Mayor of Northampton, Councillor E. Ingman.

York County Hospital.

It has been decided to establish a contributory scheme for the York County Hospital, which has an overdraft of about £18,000. Between Jan. 1st and August 1st the hospital admitted 104 accident cases, the treatment of which cost over £1000, towards which only £179 was received; of this one patient paid £88.

Davos Tuberculosis Meeting.

A meeting organised by the Davos Medical Society will be held from Oct. 5th to 10th, the subjects for discussion being (1) Development and Course of Pulmonary Tuberculosis; (2) Extra-pulmonary Tuberculosis; (3) Collapse Therapy. Lectures will be given at the Palace Hotel, Davos-Platz, in four languages, by specialists from many parts of Europe. Delegates from this country include Dr. H. Batty Shaw, Sir Henry Gauvain, Dr. L. S. T. Burrell, Dr. F. G. Chandler, and Mr. H. Morriston Davies. Prof. L. Brauer, of Hamburg, will give a public lecture on the significance of research institutes for tuberculosis. Accommodation at reduced terms will be available in nine hotels, and Messrs. Thomas Cook and Son are making the travelling arrangements. Further information from the President of the Medical Society, Davos-Platz, Switzerland, to whom names should be sent before Oct. 1st.

Medical Diary

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY, Sept. 21st, to SATURDAY, Sept. 26th.—INFANTS HOSPITAL, Vincent-square, S.W. Second week of post-graduate course in Diseases of Infants. Every afternoon at 2 P.M. WESTMINSTER HOSPITAL, S.W.—Second week of course in Medicine, Surgery, and the Specialties. Men only. Daily, 10.30 to 5.30. Further particulars from the Fellowship of Medicine.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, London, W.C.

FRIDAY, Sept. 25th.—4 P.M., Mr. W. A. Mill: Ear-ache in the Normal Ear.

ST. MARK'S HOSPITAL, City-road, E.C.

THURSDAY, Sept. 24th.—4.30 P.M., Mr. L. E. C. Norbury: Benign Strictures of the Rectum.

Appointments

Certifying Surgeons under the Factories and Workshops Acts: CAMPBELL, E. G., M.B., Ch.B. Dub. (Ripley, W. Riding); DAVIDSON, J., M.B., Ch.B. Sheffield (Hillsborough, W. Riding); PETCH, H. C., M.B., Ch.B., Leeds (Pateley Bridge, W. Riding); SADLER, C. G. A., M.R.C.S. Eng., L.R.C.P. Lond. (Teddington, Middlesex); MCGIBBON, J. H. (Higham Ferrers, Northampton), and WILSON, W. M. (Littleport, Cambridge).

Vacancies

For further information refer to the Advertisement columns.

Aberdeen Royal Infirmary.—Jun. Asst. Surgeon.
Aberdeen Royal Mental Hospital.—Second Asst. Phys. £400.
***Altrincham General Hospital.*—Jun. H.S. At rate of £120.**
Banbury, Horton General Hospital.—Res. M.O. At rate of £150.
Birmingham City Education Committee.—Two Asst. School M.O.'s. Each £500.
Birmingham General Hospital.—Med. Reg. and Res. M.O. £155.
Birmingham, Public Health Dept.—Asst. M.O. for Tuberculosis Section. £400.
Birmingham, St. Chad's Hospital.—Res. M.O. £100.
Birmingham, Selly Oak Hospital.—Cas. O. At rate of £200.
Blackburn County Borough.—Asst. School M.O. and Asst. M.O.H. £700.
Bradford City Sanatorium, Grassington.—H.P. £225.
Burnley County Borough.—Asst. M.O.H. and Asst. School M.O. £500.
Cardiff, King Edward VII. Welsh National Memorial Assn.—Two Area Tuberculosis Physicians. Each £750.
Cardiff Royal Infirmary.—Two H.S.'s to Special Departments. Also H.P. and H.S. All at rate of £50.
Central London Throat, Nose, and Ear Hospital, Gray's Inn-road, W.C.—Assts. for Out-patient Dept.
Cheadle, Cheshire, Barnes Convalescent Hospital.—Res. M.O. £250.
Chester Royal Infirmary.—H.S. £150.
Chester, Wrenbury Hall Tuberculosis Training Colony.—H.P. £250.
City of London Hospital for Diseases of Heart and Lungs, Victoria Park, E.—H.P. At rate of £100.
Eastern Dispensary, Leman-street, E.—Ophth. Surg.
Exeter, Royal Devon and Exeter Hospital.—Cas. O. and H.S. to Special Depts. Each at rate of £150.
Gateshead Dispensary.—Asst. M.O. £300–£350.
Glasgow, Woodilee Mental Hospital, Lenzie.—Jun. Asst. M.O. £300.
Golden-square Throat, Nose, and Ear Hospital, W.—Hon. Surg.
***Great Yarmouth General Hospital.*—H.S. £140.**
Guildford, Royal Surrey County Hospital.—H.S. £150.
Hammersmith Hospital, Ducane-road, W.—Asst. M.O. £350.
Hertford, Ware Park Sanatorium.—Asst. M.O. £300.
Hospital for Sick Children, Great Ormond-street, W.C.—H.S. and H.P. Each at rate of £100. Also Clin. Asst.
Kettering and District General Hospital.—Res. M.O. At rate of £200.
Leicester Royal Infirmary.—Asst. Pathologists. £400. Res. Asst. Anæsthetist. At rate of £250. Also Two Surgical Dressers. 10*s.* 6*d.* per week.
***Liverpool Eye and Ear Infirmary, Myrtle-street.*—H.S. to Ophth. Dept. £120.**
Liverpool Heart Hospital.—Hon. Asst. Physician.
Liverpool Royal Southern Hospital.—H.P., M.O. to Spec. Depts., and Res. Anæsthetist. All at rate of £60.
Liverpool, Smithdown-road Hospital.—Res. Asst. M.O. £200.
L.C.C. Mental Hospital Service.—Asst. M.O. £475.
London Female Lock Hospital, Harrow-road, W.—H.S. At rate of £150.
London Homœopathic Hospital, Great Ormond-street, W.C.—Three Res. M.O.'s. All at rate of £100.
Macclesfield General Infirmary.—Second H.S. At rate of £150.
Manchester, Ancoats Hospital.—Res. Surg. O. £200.
***Manchester Royal Eye Hospital.*—Jun. H.S. £120.**
Manchester, Royal Infirmary.—Jun. Asst. M.O. for Radiological Dept. £400.
***Margate Royal Sea Bathing Hospital for Surgical Tuberculosis.*—H.S. At rate of £200.**
Maudsley Hospital, Denmark Hill, S.E.—Deputy Med. Supt. £850.
Metropolitan Hospital, Kingsland-road, E.—Sen. and Jun. H.P.'s and H.S.'s. Also Two H.S.'s. All at rate of £100.
Middlesex County Council, County Tuberculosis Sanatorium, South Mimms.—Asst. Res. M.O. £400.
National Hospital, Queen-square, W.C.—Asst. Registrar. £200.
Norwich, Norfolk and Norwich Hospital.—H.S. for Ear, Nose, and Throat. £120.
Nottingham City Education Committee.—Whole-time Jun. Asst. School M.O. £500.
Nottingham General Dispensary, Broad-street.—Res. Surgeon. £250.
Nottingham General Hospital.—H.P. At rate of £150.
Portsmouth Royal Hospital.—H.P. and Cas. O. At rate of £130 and £100 respectively.
Preston and County of Lancaster Royal Infirmary.—H.S. At rate of £150.
***Queen's Hospital for Children, Hackney-road, E.*—H.P. At rate of £100.**
Queen Mary's Hospital for the East End, E.—Surgical and Dental Anæsthetists. 50 guineas and £25 respectively.
Richmond, Surrey, Royal Hospital.—Hon. Surg. to Ear, Nose, and Throat Dept. Also Jun. H.S. At rate of £100.
Rochdale Infirmary and Dispensary.—Jun. H.S. £200.
Royal London Ophthalmic Hospital, City-road, E.C.—Sen. Res. O. £150.
Royal National Orthopædic Hospital, 234, Gt. Portland-street, W.—Hon. Asst. Surgeon.
Royal Waterloo Hospital for Children and Women, Waterloo-road, S.E.—Cas. O. At rate of £200. Also H.S. At rate of £100.
St. Bartholomew's Hospital, E.C.—Dental H.S. £80.
St. Giles' Hospital, Brunswick-square, Camberwell, S.E.—Part-time Radiologist. At rate of £236 5*s.*
St. John's Hospital for Diseases of the Skin, 49, Leicester-square, W.C.—Jun. Hon. Med. Reg.
St. Mary's Hospital, W.—2nd Asst. Pathologist. £250. Also Obstetric Registrar. £50.
Salford Royal Hospital.—Res. H.S.'s to Special Depts. Also Cas. H.S. All at rate of £125.
Scarborough Hospital and Dispensary.—Two H.S.'s. Each at rate of £175.
***Sheffield, Jessop Hospital for Women.*—Sen. Res. M.O. £200. Also Res. M.O. and two Asst. H.S.'s. At rate of £150 and £100 respectively.**
Southampton County Borough.—Asst. M.O.H. £500.
South London Hospital for Women, Clapham-road, S.W.—H.P. and two H.S.'s. Each at rate of £100.
***Stafford, Staffordshire C.C. County Bacteriological Laboratory.*—Asst. Bacteriologist and Pathologist. £700.**
Swansea, Infectious Diseases Hospital.—Res. M.O. £350.
Taunton and Somerset Hospital.—Asst. H.S. At rate of £100.
Wells, Somerset, Mental Hospital.—Asst. M.O. £350.
West Riding of Yorkshire County Council.—Temp. Sch. Med. Inspectors. £175.
Wolverhampton Royal Hospital.—H.S. for Orthopædic Dept. At rate of £100.

The Chief Inspector of Factories announces a vacant appointment for a Certifying Factory Surgeon at Alston (Cumberland).

Births, Marriages, and Deaths

BIRTHS.

BINGHAM.—On Sept. 11th, the wife of Thomas H. Bingham, M.D., of Reigate, of a daughter.
DAVIES.—On September 15th, at 1, Pleydell-avenue, W.6, to Dorothy, the wife of G. I. Davies, M.D., D.P.H.(Lond.)—a son.
GUNN.—On Sept. 11th, the wife of Alistair Gunn, M.B., F.R.C.S., of Lawn-road, Hampstead, of a son.
HOCKING.—On Sept. 15th, the wife of Dr. F. D. M. Hocking, of 140, Harley-street, of a daughter.
REID.—On Sept. 8th, at Welbeck-street, W., the wife of Ronald Reid, M.S., F.R.C.S., of a daughter.
SAMUEL.—On Sept. 9th, at Dowlow Asshe, Vallance-road, Muswell Hill, to Dr. E. Summerskill, wife of Dr. E. Jeffrey Samuel—a daughter (Shirley).
WHITE.—On Sept. 9th, at Nailsea, the wife of Dr. R. F. White, of a daughter.
WOOLRICH.—On Sept. 8th, at Sanderstead, Surrey, the wife of Dr. W. Grant Woolrich, of a daughter.

DEATHS.

CROOKE-LAWLESS.—On Sept. 14th, at Folkestone, Surg. Lt.-Col. Sir Warren Roland Crooke-Lawless, aged 68.
JAMES.—On Sept. 9th, at Warwick-road, Upper Clapton, Charles Alfred James, M.R.C.S., L.R.C.P., D.P.H.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages and Deaths.

THE Minister of Health has appointed Captain D. W. Gunston, *M.C.*, M.P., to be his Parliamentary Private Secretary (unpaid).

NOTES, COMMENTS, AND ABSTRACTS

BIOLOGICAL APPROACH TO HEALTH PROBLEMS.

AT the annual congress of the Royal Sanitary Association of Scotland, held at Largs, in Fifeshire, Dr. Parlane Kinloch, chief medical officer of the Department of Health, the president, gave an address on the Science of Life. He showed that the administrative health problems of to-day could be safely approached only on a biological basis. He expressed his conviction that the life of members of a modern civilised community must be founded on scientific thinking and living. The health services must draw their sanctions in the last resort from the science of biology. Our gains in biological knowledge in the past 300 years, and, indeed, in the last 30 years, had far exceeded the gains made in the previous 30,000 years. He pleaded for the acceptance of a national biological policy, which would deliberately seek new knowledge and apply it to the end that, as a race, we might grow in health and vigour, resource, and adaptability. In physiology and medicine a reorientation of outlook was needed, so that assessment of fitness and assessment of the degree of incapacity would become of dominant importance. The medical research organisation would push forward the boundaries of biological knowledge, and the central and local authorities would secure the experimental application to the community of the discoveries of medical science. The true basis of administrative measures was a nutritional service. So long as the authorities ignored the achievements of biological research, so long would much of the health services remain a waste of effort. He indicated also the beginning that should be made in mental health service in Scotland by the establishment of four regional psychiatric clinics in the four university cities. At these clinics the early disharmonies leading to mental illness would be defined and controlled, and mental patients sorted out and allocated for appropriate treatment. This would have an immediate effect in reducing the number of certified lunatics as would also a review of certified cases, together with the development of treatment on a voluntary basis. The number of certified lunatics might in this way be reduced by one-third. The address was an inspiring exposition of fundamental principles as applied administratively.

THE DEVELOPMENT OF YOUNG CHILDREN.

MANY close observers of the lives of young children have written large and valuable treatises on the thinking and behaviour of the young, but even such classical writers as Wilhelm Stern and J. Piaget, for example, have erred in obtaining much of their information through questions. Mrs. Isaacs records [1] a new and fascinating departure from this method. The data of the lives of the little children in her school are given verbatim in her book. She has taken daily notes of the remarks made and actions performed in what was almost entirely a child world, the grown-ups being largely in the background or joining in only when necessary on the child's level. The result is a curious record of the discovery, reasoning, and thought of children and of their biological interests. Some readers may find this record dull and disconnected, but those who are pursuing child psychology from the educational and from the psycho-pathological point of view will discover much information on the natural pursuits and ideas of the child; many difficulties will be cleared up, and many unacceptable theories more easily understood. In an initial chapter, Mrs. Isaacs shows in what way her methods differ from those of other observers. She promises to make no interpretations while collecting data, nor does she allow herself or her fellow-observers to do more than to describe objectively what the child actually did and said, and the circumstances in which speech and action took place. In this respect she differs from Piaget, who definitely limits his field of inquiry, and therefore the scope of his conclusions, by putting questions.

Mr. Isaacs has added a considerable chapter on children's "Why" questions. This is a closely reasoned classification and analysis of the familiar attitude of children towards their environment in their efforts to coördinate their world and to rectify the disparate elements of perception. This chapter is of great value, and in our view the authors' critical attitude to the anthropomorphic views on the child's world put forward by Prof. Piaget is justified.

No workers in the field either of normal or of abnormal child psychology can afford to ignore a book by Prof. Katharine Bridges on the pre-school child.[2] It is based upon a prolonged study of the behaviour of children in contact with one another, and with their elders, and therefore illustrates the manner in which the emotional life of the child influences, and is influenced by, its social milieu. The author starts out with a method which was deduced by preliminary experiment with a provisional scheme. The working out of a social development scale must have entailed a great deal of labour. The manifold observations are at first sight very bewildering, but they provide a warning to those who use broader categories that analysis of child behaviour must depend upon detailed observations. The value therefore of the thesis will depend upon the study of a larger number of cases than are here dealt with to make them statistically comparable with the number of observations themselves. Workers in the same field would be wise if they used the author's scale in order to register their own records. A chapter is devoted to the McGill Nursery Scale, and those who are interested in the scientific study of children rather than in chatty descriptions would do well to give this their close attention. The volume is illustrated by many attractive photographs of children at play.

PRESCRIPTIONS FOR THE DEAF.

IN an article on aids to the deaf published in the *Wireless Magazine* for September, 1931, Mr. C. Balbi comments on the fact that while those with poor sight seek spectacles, the deaf do not, as a whole, avail themselves of aids to hearing. In his view, this is because spectacles are prescribed on scientific lines, and the benefits obtained are instantaneous and lasting, while aids to the deaf are chosen haphazard by the patient himself, and may be found unsuitable after purchase. Simple magnification does not necessarily help the deaf person, since amplifying appliances introduce distortion. This distortion can, he says, be harnessed to supplement the particular range in which the patient's hearing is defective. In order to ascertain this range, a standardised testing apparatus, known as the audiograph, has been devised. When the range is charted, a prescription can be formulated, for example for a bass deaf person. A micro-telephone, with the appropriate characteristic, can then be chosen, or an apparatus containing a valve amplifier can be used. Such an apparatus is necessarily more bulky, but it can be adjusted by means of filter circuits to conform to the specification required. Mr. Balbi suggests that while a portable micro-telephone will continue to be popular, its characteristic should be prescribed. He recommends, for occasions where portability is not essential, the use of an appropriately adjusted amplifier telephone.

AFTER Sept. 21st the address of the offices and warehouses of Messrs. Coates and Cooper, Ltd. (Medical and Pharmaceutical Products), will be 94, Clerkenwell-road, London, E.C.1. Telephone: Clerkenwell 4100.

[1] Intellectual Growth in Young Children. By Susan Isaacs, M.A., with an Appendix on Children's "Why" Questions by Nathan Isaacs. London: George Routledge. Pp. 370. 12s. 6d.

[2] Social and Emotional Development of the Pre-school Child. By K. M. B. Bridges, Assistant Professor of Psychology, McGill University. London: Kegan Paul. 1931. Pp. 277. 12s. 6d.